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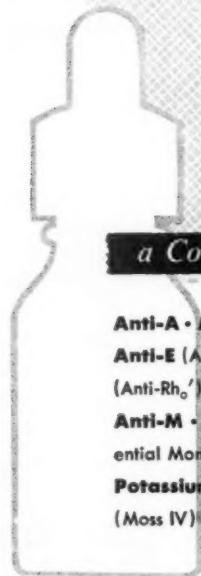
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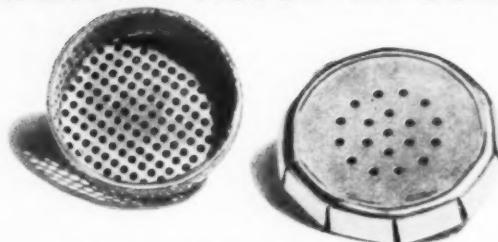
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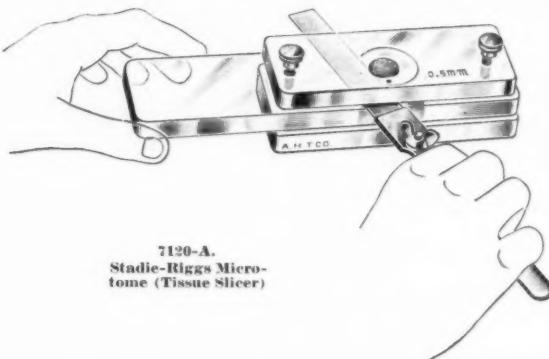
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VOLUME 17

JANUARY-FEBRUARY, 1951

NUMBER 1

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**A REPORT OF THE CULTIVATION OF NOCARDIA  
TENUIS ISOLATED FROM THREE CASES OF  
TRICHOMYCOSIS AXILLARIS, FLAVA\***

By ELIZABETH K. O'TOOLE, M.T. (ASCP)

*Department of Bacteriology, University of Colorado Medical Center  
Denver, Colorado*

Trichomycosis axillaris is characterized by soft concretions surrounding the axillary hair shafts. These concretions may be yellow, red or black. Castellani (1911)<sup>1,2</sup> in the yellow form found, embedded in an amorphous substance, enormous numbers of Gram positive non-acid fast bacillary bodies which showed occasional branching and to which he gave the name, *Nocardia tenuis*. In the red and black forms, in addition to the Nocardia, he found cocci which produced the black or red pigments. He succeeded in cultivating the cocci but not the bacillary forms. Chalmers and O'Farrell (1913)<sup>3</sup> found no evidence of branching on direct examination of the concretions, but found some evidence of growth with marked branching in serum saline dilutions. Macfie (1916)<sup>4</sup> in ascitic agar obtained slight translucent growth of the Nocardia which appeared to go through a growth cycle. Gram negative slender hyphae appeared first. They became more Gram positive and more pleomorphic with age, branching forms were numerous after one week. After one month the cultures in microscopic appearance resembled the concretion material with Gram positive granular masses and short hyphae. So far as we can determine no other authors have reported cultivation of the Nocardia forms. Castellani<sup>5</sup> as late as 1927 stated that the organisms had not been cultivated and Sibley and Muende (1931)<sup>6</sup> reported that the mycelial elements failed to develop in culture.

\* Read before ASMT Convention, Houston, Texas, June, 1950.

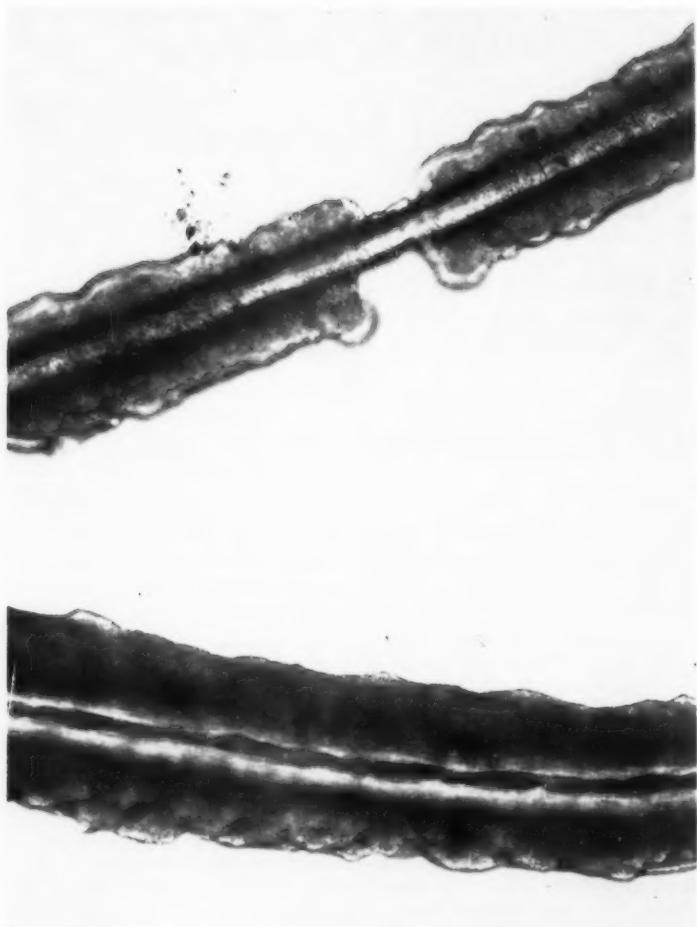


Fig. 1. Nodules of trichomycosis axillaris.  
10% KOH preparation. High Power.

During 1949 we had the opportunity to study three cases of the yellow type of Trichomycosis axillaris, all of whom had seen service in the tropics.

#### MACROSCOPIC EXAMINATION OF INFECTED HAIRS

The axillary hairs from all three cases presented approximately the same appearance. Examined grossly the infected hairs showed yellowish to yellowish-grey concretions in the form of nodules extending along the shaft of the hair. In some instances the hairs were only partially covered, in others the entire shaft was involved. These nodules were of rather soft consistency, and were easily removed from the hair by scraping. The heavily infected hairs appeared lusterless and somewhat depigmented. The roots of the hairs were firmly attached to the follicle, and there was no tendency to splitting or breaking of the hair as is seen in cases of dermatophytosis. The surrounding skin in these cases was not infected. (See Fig. I.)

#### MICROSCOPIC EXAMINATION OF INFECTED HAIRS

When infected hairs were mounted in a clearing solution (10% solution of KOH), and examined microscopically under high dry objective these concretions were seen to consist of enormous numbers of bacillary like bodies, the rod-like form of *Nocardia tenuis*. (See Fig. II.) Some cocci were seen, but not in numbers comparable to those described by Castellani (1911) and others in cases of the black, Trichomycosis nigra, and the red, *Tr. rubra*, forms. The roots of the hairs examined were not infected, and the fungus apparently did not penetrate into the cortex. Castellani has brought out the fact that the fungus tends to grow chiefly in the superficial fibers of the cuticular scale, thus forming a covering or protection for the fungus; the deeper layers of the cortex, the medulla, and the roots of the hair are not involved and this explains why the hair is so little affected.

#### CULTURAL STUDIES

Infected hairs from the three cases of Trichomycosis axillaris were planted on to Sabouraud's glucose agar plates, and on to blood agar plates. The Sabouraud's plates were incubated at 28° C., and the blood agar plates at 37° C. In 24 hours the blood agar plates contained a growth of nonhemolytic, white and yellow pigmented staphylococci; these proved to be coagulase negative and did not ferment mannitol, and were therefore considered as skin parasites. After 48 hours on the blood agar plate, greyish-yellow, nonhemolytic translucent colonies appeared. (See Fig. III.)

Microscopically, these were Gram negative slender rod forms, some were in parallel arrangement, and some were long filaments

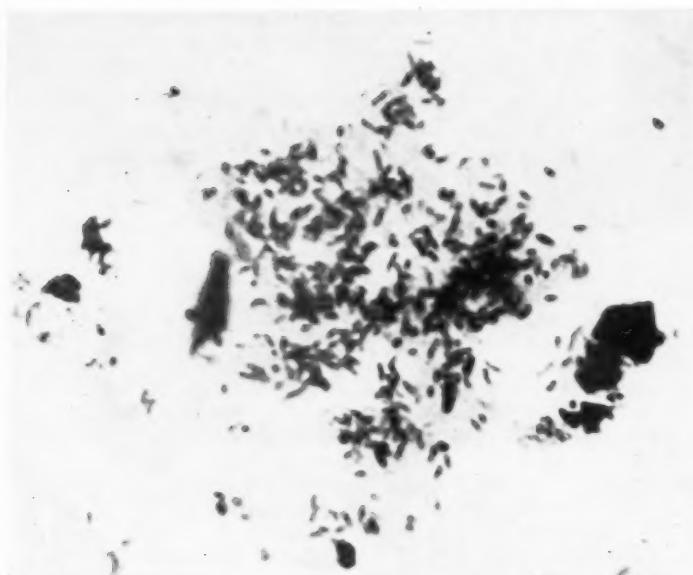


Fig. II. Gram stain of concretion scraped from infected hair. Short gram positive pacillary bodies, the tissue form of *Nocardia tenuis*.

with occasional branching, which had thickened portions along the hyphae, and a few clubbed forms were seen. (See Fig. IV.) This fungus did not grow on Sabouraud's glucose agar after one month's incubation, but the white and yellow pigmented staphylococci grew well on this medium.

Single colony isolation of this fungus was obtained and cultural reactions on various media are listed in Table I.

The failure of this organism to grow on Sabouraud's glucose agar, and the fact that growth was not obtained in any medium without the addition of blood or blood serum suggests that this organism is deficient in one or several of the essential growth factors, which in this case is apparently supplied by the addition of blood or serum to the culture medium.

Preliminary animal studies with these strains of *Nocardia tenuis* have shown them to be non-pathogenic for guinea pigs and mice. Three guinea pigs and three mice for each of the three strains of this organism were injected intraperitoneally with the growth from 48-hour serum broth cultures. These animals were observed for two months, then sacrificed, and autopsies performed. All

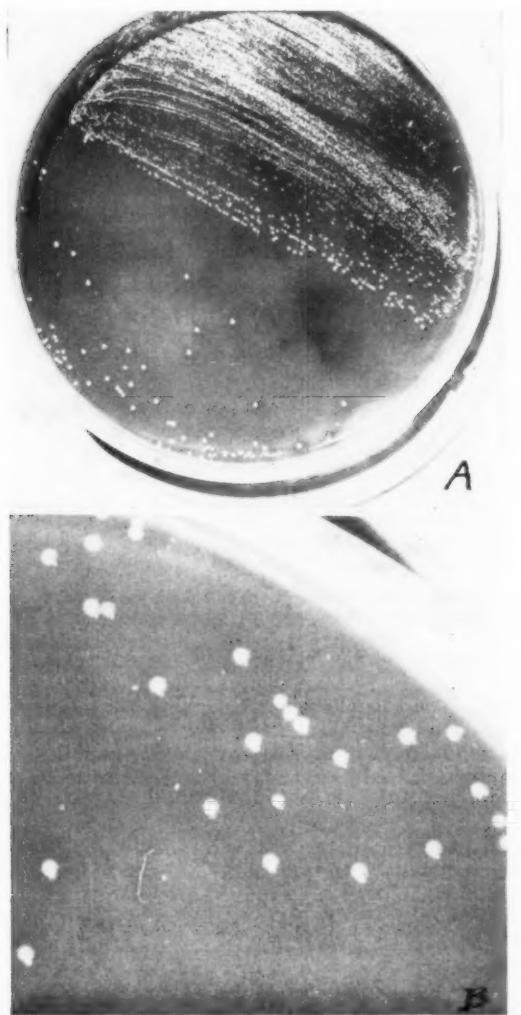


Fig. III. A. 48-hour growth on blood agar at 37° C.  
B. Magnified 4 times.

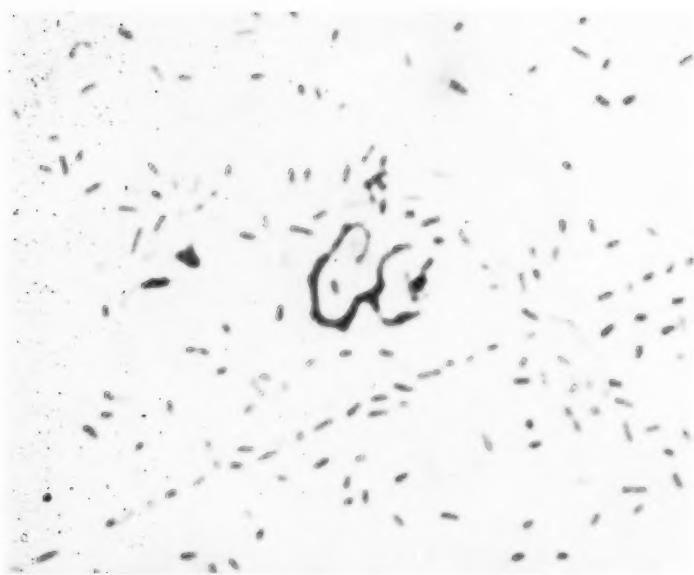


Fig. IV. *Nocardia tenuis*. 48-hour growth on blood agar. Occasional branching forms, longer hyphae, and many "diphtheroid" forms. X1200

viscera appeared normal. Heart blood cultures gave negative results.

A second experiment using nine guinea pigs (three for each strain) was as follows: On the right side of each guinea pig the hair was removed and the skin scarified by rubbing with sterile sandpaper which had been impregnated with sediment from a 48-hour serum broth culture. On the left side of these animals the hair was removed and 0.2 cc. of the same culture sediment was injected intracutaneously. These guinea pigs were observed for two months. No infection of the skin was observed, nor did the surrounding hair show evidence of concretions, macroscopically or microscopically, as appear on axillary and pubic hairs in human trichomycosis infections.

#### ACKNOWLEDGEMENTS

Grateful acknowledgement is made to Doctor R. Thompson of the Department of Bacteriology, University of Colorado Medical Center, for his suggestions and help in preparation of the manuscript, and to Mr. Glenn Mills of the Department of Visual Education for his assistance in preparing the photographs.

**TABLE I**  
**Cultural Reactions of Three Strains of *Nocardia Tenuis* Isolated from Cases of**  
**Trichomycosis Axillaris (Flava)\***

Blood agar plate, pH 7.4	48-hour growth at 37° C.: non-hemolytic, greyish-yellow translucent growth. Colonies small (1 to 1.5 mm. diam.), round, smooth granular consistency.
1% serum broth, pH 7.4	Supernatant clear with finely granular sediment.
Loeffler's glucose serum slant	48-hour growth: yellowish pigment; coagulated serum not liquefied after one month.
Gelatin (12% with 1% serum)	Granular appearing growth; not liquefied after one month.
Litmus milk with 1% serum	Alkaline; no coagulation.
Carbohydrates (with 1% serum)	Not fermented.
Anaerobic cultures (blood agar)	Only slight growth after 5 days.
Thioglycollate (with glucose)	No growth after one week.
Sabouraud's glucose agar, pH 5.8	Inoculation 28° C. No growth after one month.

\* All strains gave practically identical results.

### SUMMARY

Three strains of *Nocardia tenuis* have been isolated from concretions surrounding the axillary hair shafts from the yellow type of Trichomycosis axillaris occurring in three individuals, all of whom had seen service in the tropics.

As was brought out by a review of the available literature, the published descriptions of the macroscopic and of the direct microscopic examination of the infected hairs are excellent, and our findings are practically identical with these reports. However, we were unable to find a published description of studies of the reactions on various culture media, and on animal studies. This paper contains a preliminary report of such a study.

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## MEDICAL TECHNOLOGY IN RESEARCH\*

NILA MAZE, M. T. (ASCP)

*From the Lilly Research Laboratories, Indianapolis 6, Indiana*

Just one year ago, I was anticipating a trip to Roanoke, Virginia, to attend my first convention of the American Society of Medical Technologists. Due to my lack of familiarity with these meetings I had a healthy curiosity concerning my forthcoming experience. I may truthfully say that realization brought only pleasure. That meeting was not only a source of technical knowledge, but of friendship as well. I met technologists from across the nation who were striving with a common ambition toward the same ends, and struggling against mutual obstacles and fears. The program of that convention included almost every phase of medical technology—except one. That group of technologists, although in the minority, is of no less importance to the medical profession and to medical technology in general. I refer to those of us who have strayed beyond the hospital corridors into the far reaching paths of medical research. Each new day in Roanoke made me more acutely aware of the lack of information concerning my field of endeavor, among fellow technologists. When new acquaintances were informed as to whence I came and where I worked, they merely raised a quizzical eyebrow and drew their own conclusions as to whether or not my duties were ethical, (and indeed they are!). Or, if sufficiently intrigued, they assailed me with a barrage of questions, which I was happy to answer. Some who showed interest in my less common technological pursuits thought that you, too, might like to know how medical technology and research combine. So, I was invited to come to Houston to tell you something of what we are doing in research.

Encyclopedia Britannica defines industrial research thus, "Industrial research aims at applying to industry the truths wrested from nature by workers in science." Similarly we may give the definition of medical research as "Medical research aims at applying to medicine the truths wrested from nature by workers in science." My specific duties as a worker in science are those of a pharmacologist. Pharmacology is the science of the nature and properties of drugs, particularly their actions.

The majority of you, as technologists, come only in contact with the finished products of the pharmaceutical industry, you may have given little thought to the problems accompanying

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\*Read before ASMT Convention, June, 1950, Houston, Texas.

their development. Many of these problems and their solution have a very real effect upon you and your duties in the laboratory. Did you ever wonder how a doctor knows which medical treatment to prescribe for a patient? or which laboratory tests would be of greatest value during the course of treatment? Were you ever curious as to why and how new medications came into use? In case you have not given thought to these questions do it now. Think of all the laboratory tests, methods, and techniques available. Consider those that you use routinely, then those less common, and even the rare ones, they are almost innumerable. Why are there so many and why are they ordered,—then repeated? Most important, who were the people who dreamed them up in the beginning? The majority of laboratory tests are the by-products of research, the *product* of medical research being the ability to place in the hands of the physician a new or improved remedy. Without methods of testing the efficacy of a new treatment its value to the medical profession would never be known.

To produce a medicinal compound is the work of the chemist, but to prove its worth is the task of a crew of research technologists. As yet no miraculous remedies have just happened; some do appear to be miracle drugs, but they are products of long months and years of testing and retesting.

In research we can only make haste slowly. This fact in itself is a decided reversal of all hospital and private laboratory procedure. Indeed, the fact that we have progressed slowly has enhanced your speed by proving the safety of your methods. Utmost accuracy must be practiced in all procedures and reports. The product of our labors may mean life or death to its recipient.

When a crude drug or a new drug or chemical compound is submitted to us it is subjected to a series of tests. A permanent record is kept on file as to name, compound number, chemical configuration, source, and proposed uses, as well as the results obtained from all laboratory testing.

While tests for specific uses of the drug are in progress, it is also under the scrutiny of the toxicologists. Its acute toxicity for small animals is determined by one of many methods, depending upon the solubility and composition as well as its proposed mode of administration as a finished product. Acute toxicity methods which we use daily include intravenous injection into the tail vein of rats or mice, oral administration by stomach tube, intraperitoneal, intramuscular, and subcutaneous injections into any laboratory animal, or by any other means which might result in a lethal dose. In laboratory conversation when we refer to the toxicity of a compound, we mean its lethal dose 50, or that dose which theoretically kills 50 per cent of the test animals. This method has proven of great value as a screening test. If the

therapeutic index of a compound is not sufficient to warrant further study the compound is discarded. The therapeutic index refers to the ratio of the toxic dose to the active dose or the dose of therapeutic value.

If a drug shows promise it is then subjected to studies for chronic toxicity. We are able, by daily administration to animals, to determine possible cumulative properties of the drug. At the same time we observe any symptomatic changes in the test animals. These changes may be determined by use of many technological procedures. The complete red blood cell count is of utmost importance in evaluating the treatment used. A complete blood cell count is made on all the animals used in chronic toxicity immediately preceding administration of the drug, and repeated every seventh day for the duration of the treatment. A final blood cell analysis is made at the time the animals are sacrificed. In the chronic testing of many chemical compounds, determinations of concentrations of the drug in the blood stream are also required at weekly intervals. Although the blood cell count may be easily obtained from each individual animal, other blood chemistry tests require an amount which make it necessary to collect a pooled sample from an entire group of animals. Any animals which die during the chronic test period are submitted to the pathologist for examination. At the end of the experiment all surviving animals are sacrificed and undergo immediate autopsy at the hands of the pathologist, who makes a complete gross and microscopic tissue examination.

Methods of daily administration for chronic toxicity are as many and varied as for acute toxicity and any suitable test animal may be used. Only rats and mice have been mentioned since they are most common. Other test animals are guinea pigs, hamsters, rabbits, cats, and for many years we maintained a colony of monkeys. Oh yes! I must not forget to include bats—Did you ever attempt to make a blood sugar determination on blood from a hibernating bat? If you were able to do it before the bat thawed out, or before you froze, I would like to learn your technique. Still other species of value to research are roosters, chicks, frogs, toads, canaries, pigeons, owls, and ducks.

We reserve dogs for tests of long duration, where we make use of their ability to be trained, as well as their response to care and gentle treatment. For the past year we have been using three such dogs for a series of anemia studies. They are fed a diet which has been proven to maintain body weight with a minimum of blood cell regeneration. The diet (1) is specially prepared, and a measured amount is given to each dog at the same time daily. Every Monday we determine the complete blood volume of each dog and at the same time we make a complete blood cell count,

including hematocrit reading and reticulocyte count. Using these guides we are able to evaluate the degree of anemia. After reduction of the blood picture to the anemic state, by means of phlebotomy and diet, we give treatment to correct the anemic condition, and hope for favorable response. If the condition does respond and the hematocrit and hemoglobin values indicate regeneration to a high level which persists for a significant period, we are again ready to start our experimental cycle. These animals have become very valuable, and with their present care, and the maintenance diet they will continue in use indefinitely.

The possible medical value of a compound is investigated by every means available to science. The electrocardiograph and stethoscope are employed to show effect on heart action. Records to show effect on blood pressure also provide a means of measurement of the value of the drug as a circulatory stimulant or depressant. The effects on muscle tone and their duration on the various types of muscle are also recorded. The possibility of irritation is determined, as well as the fluctuations of body temperatures. Any anesthetic or analgesic qualities must also be taken into account.

I have touched on only a few of the tests to which a compound is submitted. It would be futile to enumerate all of them. Some compounds require only one or two specific examinations, most common of these being those to be tested for effect on blood sugar. For these determinations we administer the drug to rabbits from which food has been withheld overnight. A normal fasting blood sugar determination is made on a sample of blood collected through a nick in the marginal vein of the ear. Then, after the drug is given, sampling is continued at regular intervals until no further apparent effect on blood sugar is shown. With proper technique only one opening need be made in the rabbits ear for collection of all samples. Any reliable micro method may be used for the determination of sugar in the blood samples.

The sulfa drugs comprise another group of compounds demanding special testing. Here again we use rabbits as test animals. The drug is usually given orally by stomach tube. A standard color curve must be made by charting graphically the amounts of color produced by a series of known dilutions of the sample to be tested. The amounts absorbed into the blood stream are then determined by comparison of the color produced by the amount of drug in each blood sample with the known amounts shown on the curve. If a series of similar drugs are to be tested we attempt to test all on the same rabbits. This plans helps to eliminate the errors due to individual variations among test animals.

Standard known methods are used whenever possible. Since

each compound is new and each one differs from another in some manner, standard methods are not always available. Another stumbling block for this procedure is the fact that our patients are animals, not humans. We must adjust the basic principles of the old methods to fit our needs, then contrive some means of adaption. New developments must be adjusted to each individual situation, then applied, and altered until we attain the method which gives the most consistently reproducible results.

Almost any of the laboratory apparatus to be found in the modern hospital laboratory is available for our use in research. But some must be redesigned for maximum efficiency in animal testing. Some of our equipment and the techniques for using it are indeed quite unique, but these were derived of necessity. We have animal holders specially designed for the immobilization of rabbits, mice, guinea pigs, rats and other small animals. These are a major aid in the technique of intravenous injection, as well as the collection of blood samples for bio-chemical assay. The lowly razor blade and the barber shop electric clipper add to the ease of our labors. We use standard certified equipment when it is available, thus insuring the reproducibility of our results in any similarly equipped laboratory. Here we are always aware that the certification of equipment is valuable only when employed by a technician skilled in its use.

An ideal situation would be the availability of chemotherapeutic techniques on animals for each and every drug of promise. Unfortunately that is not possible. Many diseases of man remain stubbornly unreproducible in animals of any other species. We have some chemotherapeutic techniques, however, which are quite dependable. Among some of the more easily producible ailments are those caused by burns and wounds. These are easily accomplished by mechanical means, and the efficacy of treatment is measured by the length of time necessary for it to promote complete healing of the injury. A control group of untreated animals, injured in a similar manner must be observed with the treated group.

The production of malaria in birds by introduction of malarial parasites into the circulatory system, and treatment of the resulting malarial symptoms was a widely used technique in the search for effective antimarial compounds during the war years. By this procedure thousands of drugs were tested. In other words the technologists were called upon to make thousands of intravenous injections. Then, they collected an equal number of blood smears, and from these they had to determine the number of malarial parasites circulating in the blood stream. Ducks were used for this testing during the war, but it has been

suggested that if we ever resume a comparable volume of such testing, turkeys should be the host animal. An occasional turkey dinner might then reward our labors.

The sudden appearance before the public of the first awe inspiring miracle drugs, the antibiotics, set every medical researcher to work in an attempt to produce, reproduce, or improve upon the first available product. This campaign has known no bounds and has incorporated the combined efforts of technologists in serology, bacteriology, and mycology. Their efforts have produced penicillin in many forms, aureomycin, streptomycin, chloromycetin and all the other related products now available. With these have come the methods for the determination of their concentration in the body fluids. They have gone further and determined the type of organisms and infections for which each antibiotic is most specific. A service of economic value both as regards time and money.

The development of all the combinations of compounds which are now obtainable by the medical profession has necessitated a multiplicity of testing. Each compound must be proven individually and in combination with the other component parts. Then all the chemicals or chemical agents used in its processing and production must also be tested for their effect on the safety of the finished product.

After all the various testing procedures have been completed on animals and all possibility of harmful effect has been eliminated to the satisfaction of our research staff, the compound is allowed to be given to humans for clinical testing. Here it is launched on its career as a treatment for suffering humanity.

As research technologists we hope that our efforts toward the alleviation of the pain and suffering of mankind are of value comparable to that of the hospital technologist, because without some means of treatment, diagnosis of disease is robbed of its value. In the reverse perspective without the patient, the doctor and the hospital there is slight need for the products of healing.

Acknowledgment—The author is indebted to Dr. K. K. Chen, Mr. R. C. Anderson and Mr. C. L. Rose for their helpful suggestions and editorial assistance.

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# A RAPID QUALITATIVE TURBIDITY METHOD FOR DETERMINING THE RELATIVE SENSITIVITY OF THE URINARY ORGANISMS TO THE VARIOUS SULFONAMIDES AND ANTIBIOTICS\*

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There is a growing need for a simple, rapid, qualitative method for determining the sensitivity of the various bacterial pathogens and opportunists isolated from the urine to the several sulfonamides and antibiotics now in therapeutic use. Such a simplified method would benefit the patient by cutting down the number of sick and hospital days. It would also benefit the physician by giving him a quick clue as to which of the sulfonamides or antibiotics show the greatest therapeutic value as demonstrated by a rapid sensitivity test. Further, a rapid qualitative sensitivity method as described here, makes it possible to report the sensitivity of an organism often before it is definitely identified by the usual cultural and biochemical methods, which often takes several days.

## PROCEDURE

1. Accurately weigh (analytical balance) 1 mg. and 15 mg. samples of the following drugs: Aureomycin, Gantrisin, Penicillin, Sulfamerazine, Sulfadiazine, and Streptomycin, respectively. These samples are stored in individual powder papers until ready for use.
2. The organism to be tested may be a 12 to 24 hour broth culture of the bacteria isolated from the urine sediment, or the organism may be tested *directly* from the urine sediment itself, when the initial Gram's stain reveals an abundance of bacterial flora.
3. Prepare ordinary culture tubes containing 20 cc. of plain sterile broth. These are stored in the refrigerator until ready for use.
4. **Method:**
  - a. Set up the sensitivity test by adding the weighed samples of drugs, above, each to a separate tube of the 20 cc. of plain sterile broth above.

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\*\* From Department of Clinical Pathology, Dr. Frank H. Tanner, Pathologist and Director and Dept. of Urology, Dr. H. V. Munger, Lincoln General Hospital, Lincoln, Nebraska.

- b. Mark each tube carefully with the kind and amount of drug.
- c. Now inoculate each tube with 2 or 3 loopfuls of the broth culture to be tested or the urine sediment, itself, as the case may be.
- d. Prepare a control tube by inoculating a sterile tube of broth with the young culture or urine sediment, using a broth tube which contains no drug.
- e. Incubate all tubes and the control overnight, or about 12 hours, at 37 degrees C.
- f. Read the tubes for evidence of inhibition of the growth of the organism in the various tubes. Check all doubtful results with a Gram's stain.
- g. **Record as Follows:**
- 0... No inhibition of growth, or clouding in the 1 mg. and 15 mg. tubes. Hence, drug is of no therapeutic value.
  - 1+. Slight or partial inhibition, or clouding in the 1 mg. and 15 mg. tubes, but less clouding than in the control tube. Hence, drug is of slight therapeutic value.
  - 2+. Moderate inhibition of growth, or clouding in the 1 mg. tube, the 15 mg. tube being clear. Hence, drug is of moderate therapeutic value.
  - 3+. Considerable inhibition of growth, or only slight clouding in the 1 mg. sample, the 15 mg. tube being clear. Hence, drug is of a considerable therapeutic value.
  - 4+. Complete inhibition of growth, or no clouding, i.e., no growth, in either the 1mg. or the 15 mg. tube of test drug. Hence, drug is of the greatest therapeutic value.

#### SENSITIVITY OF URINARY ORGANISMS

Organism.....	E. Coll	Strep. E.	B. Proteus	B. Intermed.	M. Albus	D. Pneu- moniae
Percentage.....	35%	17.5%	13%	10%	7%	5%
Aureomycin.....	4+	3+	4+	4+	4+	4+
Gantrisin.....	3+	2+	2+	2+	4+	0
Streptomycin.....	3+	4+	3+	4+	4+	4+
Penicillin.....	3+	3+	1+	2+	4+	4+
Sulfadiazine.....	1+	1+	1+	0	4+	0
Sulfamerazine.....	1+	1+	1+	0	1+	0

- 0—No inhibition of growth; no therapeutic value.  
 1+—Slight inhibition; slight therapeutic value.  
 2+—Moderate inhibition; moderate therapeutic value.  
 3+—Considerable inhibition; considerable therapeutic value.  
 4+—Complete inhibition; greatest therapeutic value.

## SENSITIVITY OF URINARY ORGANISMS

Organism	K. Pneu.	B. Aerogenes	Pseu. Aerugin	B. Salmon.	B. Shigella	M. Albicans
Percentage.....	5%	3%	2%	1.5%	0.5%	0.5%
Aureomycin.....	3+	2+	3+	2+	Not Determined	
Gantrisin.....	1+	1+	2+	3+	Not Determined	
Streptomycin.....	0	2+	1+	2+	Not Determined	
Penicillin.....	0	0	0	0	Not Determined	
Sulfadiazine.....	0	0	0	1+	Not Determined	
Sulfamerazine.....	0	0	0	0	Not Determined	

0—No inhibition of growth; no therapeutic value.  
 1+—Slight inhibition; slight therapeutic value.  
 2+—Moderate inhibition; moderate therapeutic value.  
 3+—Considerable inhibition; considerable therapeutic value.  
 4+—Complete inhibition; greatest therapeutic value.

The above show the results of one hundred (100) cases studied by the simple qualitative turbidity method for determining the sensitivity of urinary organisms to sulfonamides and antibiotics as described in this paper. These cases are from the department of urology and were studied in the Clinical Laboratory at the Lincoln General Hospital, Lincoln, Nebraska.

Some of the interesting findings in this laboratory in the study of bacterial sensitivity by this method are as follows:

1. The majority of the organisms isolated are highly sensitive to Aureomycin.
2. We have isolated one strain of *B. Proteus* which was sensitive only to Aureomycin.
3. An additional strain of *Proteus* was isolated which was not inhibited by any of the test drugs used.
4. An additional strain of *B. Proteus* was inhibited only by Gantrisin.
5. We have isolated three different strains of pneumococci which were apparently fast to Penicillin, but which were inhibited completely by Streptomycin and Aureomycin.
6. Most strains of *Bacillus Paracolobacterium* isolated were found to be sensitive to all the drugs tested.

The organisms isolated were identified by the usual cultural and biochemical characteristics employed in the routine study of Urine Bacteriology. The Sensitivity test was always started from the original urine sediment along with the initial cultures whenever possible, or from the 12 or 24 hour original broth culture. Hence, it has been possible to report the sensitivity of the organism found in the urine sediment 24 hours, or 48 hours at the latest, after the urine specimen was received in the laboratory. The drug showing the greatest therapeutic value can then be administered without undue delay.

### SUMMARY

This paper describes a rapid, simple, qualitative method for determining the sensitivity of urinary organisms to the various sulfonamides and antibiotics now in therapeutic use. By this method the physician is given a quick clue as to the drug which shows the greatest therapeutic value. The patient acutely ill with a urinary infection is benefited because the most effective drug is administered promptly even before the offending organism is completely identified.

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## SOME RECENT ADVANCES IN CANCER RESEARCH

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Cancer is the second leading cause for death in the United States. This high mortality rate is the reason for the extensive research and interest that is being focused on cancer today. It is gratifying to know that more money, scientific thought and research is being directed toward its solution than any other one single group of diseases. There are now over fifteen medical journals devoted entirely to the subject of cancer and six publications that deal exclusively or in part with the special indexing and abstracting of cancer literature. Probably the one containing the most up-to-date information and therefore the most valuable, is "Current Cancer Literature" published monthly by the American Cancer Society. This is a remarkably fine abstract service and would be the starting point for anyone wishing to obtain recent information on a particular subject in this field. It is the purpose of this article to review some important advances in the field of cancer research. Preliminary to this, some of the already established and accepted facts about cancer will be discussed briefly.

### SOME OF THE KNOWN AND ACCEPTED FACTS ABOUT CANCER

Factors known to be important in the origin and development of cancer can be divided into intrinsic factors and extrinsic factors.

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**Intrinsic Factors:**

Heredity: Known hereditary influences have been recognized and clearly established from clinical observation in human beings and extensive experimentation in laboratory animals. Certain types of cancer in man consistently follow an inherited pattern. Familial polyposis of the colon is invariably associated with cancer of that organ and many tumors of the eye show strong familial tendencies. Cancer occurring in identical twins (monozygous) has a striking tendency to develop in both individuals at approximately the same age and in the same organ. This clearly indicates a fundamental inherited tendency operating exclusive of any external influences. Further evidence of a constitutional factor is noted in the development of multiple cancers in the same individual. Statistical studies have shown that a person who develops a cancer has a six times greater chance of developing another than a person who has never had the disease. Breast cancer in mice follows the Mendelian laws of inheritance and has been extensively studied.

Age: Certain types of cancer develop only in certain age periods. Some types of tumor of the brain, eye, and kidney occur exclusively in persons under the age of 15. On the other hand, carcinoma of the prostate gland and carcinoma of the lung rarely appear during this period but, instead, can be found most frequently in persons in the fifth decade of life.

Sex and Hormones: Early workers in the field of cancer research were struck by the development of certain types of cancer in specific tissues apparently determined by sex and hormonal influences. For example, cancer of the breast is found almost exclusively in women; men also have breast tissue but they develop only 1 per cent of all breast cancers. Carcinoma of the prostate gland is found solely in men, and although women have a small rudimentary gland, it is never the site of cancer development. These observations leave no doubt but that the genesis of cancer of the breast and cancer of the prostate is significantly influenced by the male and female hormones. Excellent proof of the importance of hormonal influences in the development of breast cancer has been shown in mice. When the mice of a high breast cancer strain are castrated, the expected incidence of the breast carcinoma is significantly reduced. If female hormones are given by injection methods following the castration, the incidence of carcinoma is usually the same or reduced only slightly.

**Extrinsic Factors:**

Carcinogenic Substances: The finding of chemical substances that would produce cancer in animals has been an important discovery and has provided excellent experimental tools to study

the problem of cancer. The initial discovery in this field was made by Sir Percivil Pott who in 1775 showed that cancer of the scrotum occurring in the chimney sweeps of England could be prevented by protecting their bodies from contact with coal soot. Then, 140 years later (1915), the Japanese researcher, Yamagawa and Ichikawa produced skin cancers in rabbits by the repeated application of coal tar to the skin of the ear. Still another fact regarding the carcinogenic properties of coal tar was brought out in England in 1924, when Kennaway showed that the carcinogenic agent in coal tar could be isolated and defined chemically. Following these basic discoveries, there have been synthesized over 300 compounds from coal tar with proven carcinogenic properties. Experimental work with these compounds has yielded a great deal of valuable information regarding the development and growth of cancer.

**Physical Agents:** The effect of ionizing irradiation from radium, uranium, actinium and thorium and x-rays are now known to be carcinogenic for such tissues as skin, bone and the blood forming organs. Ultra-violet rays from solar radiation are also known to be carcinogenic for cancer of the skin. It is a well known fact that those individuals who are continually exposed to the sun have a high incidence of skin cancer appearing on the exposed part of the body such as the hands and face. Thermic radiation can be carcinogenic if the temperature is sufficiently high to cause carbonization of the skin.

**Living Agents:** Some investigators have divided all types of cancer into two types: those known to be caused by a viral agent and those that are not. The Rous sarcoma, fowl leukosis, Shope fibroma, Shope papilloma and kidney carcinoma of the leopard frog are the tumors known to be caused by a virus. These tumors occur exclusively in animals. Despite the great effort to recover a viral agent from human cancer, none has been found. The "viral theory of cancer" assumes that all types of cancer are caused by a virus. In those cancers where present methods have failed to demonstrate a virus, it is argued that this failure is due to the inability of the methods employed to detect the viral agents that have unusual physical properties and growth requirements. The concept of an ultra-microscopic viral agent being responsible for all types of cancer is a most intriguing idea, for if this could be proven, the problem of cancer would then be reduced to a single common denominator and research in the field could be directed towards its solution.

#### SOME RECENT ADVANCES IN CANCER RESEARCH

Research in cancer is being carried out on a large scale in many different fields and is making many significant contributions to our better understanding of this disease. Because it is not possible to review all of the important recent advances in

this field, four representative ones were selected.

Radioactive iodine in the treatment of thyroid cancer: Here, a theoretical goal in cancer research has been partially attained. When radioactive elements became available, scientists immediately saw the possibility of selectively delivering ionizing radiation in lethal quantities to cancer cells by finding some isotope that could be selectively metabolized and concentrated by the neoplastic cells. Thyroid cancer offered a splendid opportunity because of the selective metabolism of iodine by thyroid tissues. If this type of cancer would metabolize and store the iodine in concentrations comparable to that of normal thyroid, the tumor cells could be destroyed. Clinical experience has shown that certain thyroid cancers will pick up radioactive iodine, but this capacity varies directly with the degree of differentiation resembling normal tissue. Unfortunately only 50 per cent of thyroid cancers have sufficient differentiation of growth patterns to store iodine. An even greater disappointment is the fact that out of the 50 per cent only 2 per cent store sufficient radioactive iodine to be of therapeutic value. However, one extremely interesting and encouraging observation has come out of these studies of thyroid cancer and radioactive iodine. This has been the fact that those poorly differentiated thyroid cancers having little or no ability to concentrate radioactive iodine can be stimulated to do so by removing all of the normal thyroid tissue from the body. The absence of the normal functioning thyroid tissue then forces the cancerous tissue to take over the lost function of the removed gland. Once this is accomplished, the cancerous tissue will store iodine.

A few cases of thyroid cancer with widespread metastases have been successfully treated by this method. Even though the number of successfully treated cases is small, it demonstrates the working ability of the original principle conceived for the use of isotopes in the treatment of cancer, i.e., the delivery of ionizing radiation to cancer cells by finding an element that will be selectively metabolized and stored. These observations about radioactive iodine and thyroid cancers are most encouraging and point the way to wider application in the field when the basic biochemical processes of metabolism of cancer cells are better understood. Moreover, it has established an important point about the biological behavior of cancer, that under certain circumstances its function and growth capacity can be changed by applied influences. This point was clearly demonstrated when the thyroid cancer took over the function of the normal thyroid tissue, once it had been removed. Cancer, then, is not the totally uncontrollable growth of cells with complete independence from the influences of the body that it was originally thought to be. The old definition of cancer, that it is "an autonomous new growth of tissue serving no useful purpose"

must now be modified. When the principle of selective metabolism of a radioactive element by cancer cells can be applied to other types of cancer, significant advances can be expected in their control and treatment. However, it must be emphasized that the thyroid cancers that have responded to therapy are cancers showing differentiation so complete that it is frequently difficult to distinguish the cancerous tissue from normal glands. Other types of cancer will present infinitely more complex problems for solution since rarely are they so well differentiated. The vista of this approach and type of work in cancer research is most intriguing, but it must be realized that the road will be long and difficult before desired results are obtained.

**Effect of cortisone and ACTH on Cancer:** Cortisone is a steroid hormone produced by the adrenal gland. ACTH (adrenocorticotrophic hormone) is a hormone produced by the pituitary gland that stimulates the cortex of the adrenal gland to produce various hormones including cortisone. The giving of ACTH is therefore the equivalent of giving cortisone. The initial work with cortisone has shown that among other effects on the animal organism, there is produced hypoplasia and atrophy of lymphoid tissues in the body. Therefore, it appears that these hormones might be effective in retarding the growth of lymphogenous tumors. Basis for this assumption was obtained when it was shown that cortisone caused moderate regression of certain types of lymphoid tumors in mice. Preliminary work with human tumors indicate a favorable response on certain types of leukemias and lymphomatous tumors. However, it is the opinion of investigators working in this field that although results in some instances are encouraging, cortisone and ACTH probably offer only another form of palliative therapy. It must be further stressed that there are many harmful and undesirable side effects resulting from these drugs and these must be carefully weighed with the expected beneficial results.

**Steroid Hormones in the Treatment of Breast Cancer:** It is a well known fact that in mice, the incidence of breast cancer in a high cancer strain can be significantly reduced by castration. This observation and others indicating that breast cancer in mice could be influenced by sex hormones naturally suggested the use of hormones in the treatment of breast cancer in man. Although preliminary results were discouraging, the interest in the problem has recently been revived and beneficial effects have been noted by changed methods of dosage and technique of administration. Because of these recent successes in this field, The Therapeutic Trials Committee of the Council on Pharmacy and Chemistry of the American Medical Association has encouraged the collective study of the problem and the pooling of results by establishing study groups in many parts of the United States. Preliminary results from these study groups

indicate that a significant number of cases of breast cancers can be influenced favorably by the appropriate use of sex hormones (androgens or estrogens). These results are encouraging since they clearly demonstrate, as was shown with thyroid cancer, that the growth of the cancer under certain circumstances, can be modified and controlled by exogenous influences. The investigators in the field are emphasizing that, even though results may be encouraging, the use of sex hormones is not a cure for cancer but only palliative in its effects.

A Coordinated Attack Upon a Disease: Significant trends in the fight against cancer have been (1) the wide recognition of it as a biological problem, (2) organization of research groups following the most diverse lines of inquiry and investigations and (3) the wide recognition of a need for coordinated programs of research and cancer control. In the writer's opinion, the results presently being attained from these coordinated efforts are the greatest single advances in the field. It is most assuring and comforting to know that biologists, chemists, physicians, pathologists, researchers of all types and social workers have all joined in the fight against the disease occupying the number two position in the mortality list of the United States. The activities of national, state, voluntary and professional agencies providing research institutes, cancer hospitals, and cancer control programs are monuments of testimony to the seriousness and intent of the coordinated attack. Cancer control work deserves special mention because its effects are seen in so many ways; through lay education, it can attain early diagnosis and consequently better therapy for the patient and through the stimulation of general interest there is an increase of financial assistance. Cancer control in itself will never solve the basic problem of the neoplastic process, but it does have the inherent advantage of quick results in saving many human lives by the early institution of therapy when the disease is in the curative stage. The results that can be obtained from a coordinated attack upon a single disease are clearly documented in what was accomplished when interest and coordinated effort was focused on the infectious diseases. It is to be remembered that 100 years ago, 80 out of every 100 persons in the United States died before the age of 40 and now, 80 out of every 100 live beyond this age. This remarkable increase in life expectancy has resulted from control of the infectious diseases through the co-ordinated efforts and interest of national, state and professional groups. It is reasonable to suppose that if cancer, now the second leading cause of death, can be as effectively controlled and treated in the next 100 years as has been the case with the infectious diseases during the past, that life expectancy will again be increased.

## SYNOPSIS OF THE THEORY AND USE OF KLETT-SUMMERSON PHOTOELECTRIC COLORIMETER

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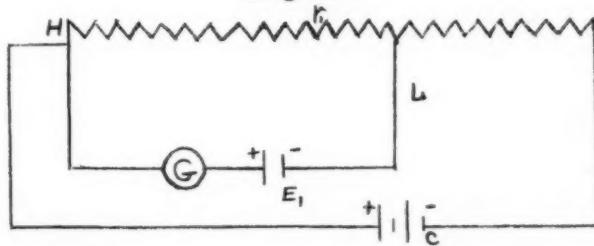
Has it ever been your misfortune to find that your Klett-Summerson is not working right and in final desperation sent it to the factory to be repaired? Even when it is returned, weeks later, you are still in the dark as to the origin of the trouble, and eventually the procedure is repeated.

There are many and varied sources of trouble in the photoelectric colorimeter procedures—including your own technique!

Before we consider the machine proper and its mechanism, let us first differentiate between photometry and colorimetry. Photometry is based upon the direct measurement of color intensity in terms of the light-absorbing power of the solution at a specific region of the spectrum; and colorimetry is a procedure in which the colored solution representing the substance in the unknown quantity is brought to exact color match with a standard color representing the substance in known concentration. As you can see from this definition, for higher accuracy in colorimetric procedures it is advisable to utilize a mechanism that eliminates the human error in determining the concentration of unknown solutions.

The photoelectric colorimeter is an electrical appliance that has a working basis of two photo cells, a potentiometer, a magnet, a galvanometer, and a 400 ohm fixed resistance. To understand the mechanism of the potentiometer and its relation to photometry let us delve into the innermost portion as surgeons do and revert to some simple physics of the potentiometer itself. In its simplest form it is used to compute the electromotive forces of different cells. A current ( $c$ ) gives a constant current through a resistance, as is shown in Diagram I.

Diagram I



Connected to two points, H and L, on this resistor is a galvanometer (G) and a cell whose electromotive force is  $E_1$ . Because the potential of the point H is higher than that of the point L there is a tendency for current to flow from H through the galvanometer. But the cell  $E_1$  is connected in such a way as to tend to send a current through the galvanometer in the opposite direction. By moving the contact point L along the resistance, a point can be found where these two effects will neutralize each other and no current will flow through the galvanometer. When no current flows through the galvanometer, the electromotive force of the cell  $E_1$  will be opposite and equal to the voltage between H and L. Thus the current in the resistance ( $r_1$ ) can be computed. If another cell  $E_2$  has its electromotive force substituted for  $E_1$  a new point L, for which no current will flow through the galvanometer, can be found and the resistance between H and L can be computed. In the commercial form of a potentiometer the ratio between the two resistances  $r_1/r_2$  can be read off directly; thus the ratio of the electromotive forces of the two cells is known. If one of the cells is a standard cell whose electromotive force is known, the electromotive force of the other cell can easily be computed. This, as you can see from the diagram of the Klett-Summerson photoelectric photometer set-up, is exactly the same principle employed in its photoelectric cell circuit.

The complete mechanism is demonstrated in Diagram II and III.

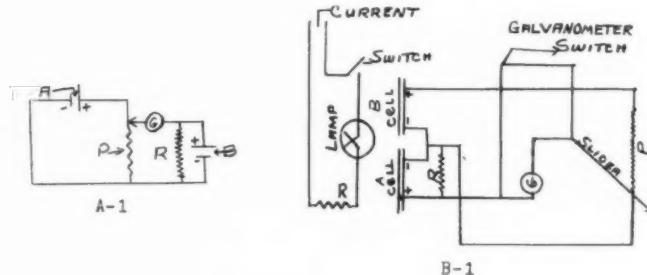


Diagram II

- A. "Working" photo cell
- B. "Standard" or "reference" photo cell
- G. Galvanometer of low sensitivity
- P. 400 ohm potentiometer
- R. 400 ohm fixed resistance

The purpose of the 400 ohm resistance is to maintain a current of definite and uniform value, because there must be just as much input of energy as output. Ohm's law applies for a current which is constant in magnitude, and a certain amount of time is required before the current reaches its final steady value (warming up period).

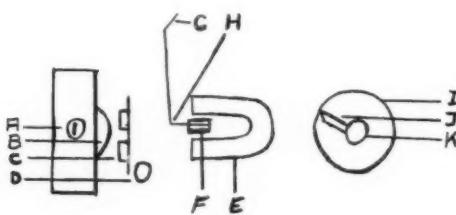


Diagram III

- A. Light with filament parallel to—
- B. Condenser lense
- C. Photo cells
- D. Knob to adjust light on photo cells to bring them to equilibrium
- E. Magnet
- F. Suspended galvanometer
- G. Galvanometer switch (short circuit switch)
- H. Galvanometer needle
- I. Wire wound potentiometer
- J. Contact point of potentiometer
- K. Scale knob

The galvanometer employed in this instrument is a suspended wire type that is in the center of the magnetic field and is sensitive to shock, vibration and air currents. The incoming current causes a rotation of the galvanometer and thus deflects the galvanometer needle. By adjusting the light on the photo-cells a point is reached where the current is equal and the machine is at equilibrium, or is at the "zero" point on the potentiometer scale. Now that we have analyzed the internal structure of the Klett-Summerson, let us progress to the actual mechanism of the machine.

The instrument is characterized by a double photo-cell photo-electric colorimeter employing standardized interchangeable test-tubes as solution containers, and with a potentiometer measurement of the changes in current output of the photo-cell against which measurements are made. The measurements are independent of the actual value of the photo-cell current, but depend only on difference in current output for the unknown solution as compared to the reference standard. A light from the projec-

known as Beer's law. The equations for relative transmission, concentration and depth of solution, at a given wavelength, are the fundamentals upon which photometric analysis is based and may be found in any chemistry book. Where Beer's law is applicable, the optical density (or percent) is directly proportional to concentration. It is advisable to run a standard with each series of tests run and by knowing the concentrate of the standard, the unknown can be calculated from the determined density of the standard. Thus, the formula below can be employed for any tests that follow Beer's law so long as the value of the standard is known.

$$\text{Con. of } U = \frac{\text{Density of Unknown}}{\text{Density of Standard}} \times \text{Con. of Standard}$$

This calculation is quite similar to that used for visual colorimetry except for the direct instead of inverse proportionality between concentration and readings. It is subject to the same limitations concerning the use of concentration, rather than amount, and for accurate and reproducible results it is essential that all steps in the procedure be carried out under as carefully controlled conditions as possible without deviation. Such factors as time of heating and cooling, order and rate of addition of reagents, age of reagents, the time of standing and temperature of solution during color development, presence of nonchromogenic material such as neutral salts, and even the volume of solution in which the color reaction occurs, are known to influence the final color intensity for a given amount of material in many, if not all, colorimetric procedures. Beer's law is valid where there is a liner relationship between optical density and concentration. Some tests that do not adhere to this law include the determination of blood creatinine by the alkaline picrate reaction. Those instances of deviations are rare, fortunately. In those instances the relation between the concentration and optical density will not be linear, and results must be based upon a calibration curve. The reason for the curve is that the circuit is not proportional to light intensity, and the relationship between optical density and concentration is not linear. When such calibrated curves are employed it is assumed the particular density or transmittance will always represent a particular concentration in an analysis. Practically, this may or may not be true. Other factors which influence color intensity aside from concentration have been emphasized. Such substances as hemoglobin, where the light-absorbing power is an integral property of the molecule itself, variations in environmental conditions or in the potentiometer itself may influence the readings. Thus the use of a previously prepared calibrated curve may be at best only an approximation, and gross errors are known to result from its use.

Colorimetry without standard solutions does not exist. Under some conditions a calibrated curve may be employed when a sacrifice for accuracy is permitted. If this be the case, the curve must be computed in one's own laboratory using the reagents and photometer which will be employed for analysis. Data obtained from literature or the manufacturer of the machine should never be used without checking to determine its accuracy, and this checking must be repeated at frequent intervals if satisfactory results are expected. Analysis must be carried out with vigorous control of the various steps involved, reproducing as far as possible the conditions under which the curve was constructed.

The relationship between the transmittance of a solution containing light absorbing material and the wavelength of light passing through the solution is given by the so-called absorption spectrum of the substance. Various charts can be plotted to demonstrate the curves of the relationship of optical density to wavelength, but this will be omitted in this discussion. The most satisfactory wavelength is the one which, at a given depth of solution, shows agreement with Beer's law over as wide a range as possible of the concentrations apt to be encountered in the analysis, and which permits this range to be read within the most accurate region of the photometer scale.

The most accurate region of the scale corresponds to densities between 90 percent-10 percent transmittance. Readings outside this range represent solutions which are either too dark or too light for accurate measurements. At 95 percent, transmittance corresponds to a 10 percent error in analysis; and for dark solutions, the transmittance represents a disproportionately large change in concentration. Therefore, the sample must be read between the scale limits specified if maximal accuracy is obtained. To fulfill these requirements a wavelength must be selected which represents a very low sensitivity so that the solution will have a low light absorption. In general, it is better to modify the light absorption photometric procedures, and this is accomplished by the selection of a suitable wavelength. Other factors influence the choice of wavelength to include that agreement with Beer's law so the measurement will be more satisfactory over a wide range of concentration at one wavelength than at another, or that the color will be more stable when exposed to light of one wavelength than another. Some selections entail a decreased sensitivity with an increase of analytical value, or it is sometimes possible to select a wavelength at which there is only minimal light-absorption by extraneous material so that it will not interfere significantly with the analysis.

The wavelength may be established by the choice of light filters. These filters consist of selected glass which is capable of transmitting light over a limited portion of the spectrum only. By placing such a filter in the light path of the photometer, measurements can be made in the spectral region corresponding to the transmittance range of the filter. It is customary to designate a filter in terms of the wavelength of peak transmittance; thus a filter No. 54 has its peak transmittance at 540 millimicrons. A good filter will show about 85 percent transmittance or more of the total light over a spectral width of 30-50 Mu, or so, centered around the wavelength of peak transmittance. Ordinarily the Klett-Summerson comes equipped with a blue, No. 42 (400-450 Mu) and a green, No. 54 (520-580 Mu) filter. It is best to add the red, No. 66 (640-700 Mu) for the determination of some special tests that employ this wavelength; i.e., Phosphorous and Phosphatase. These three basic filters are all that are needed for medical laboratory procedures, but should one desire a specific wavelength for a specific procedure as is done in some research work, there are filters available from which one may choose any or many.

The procedure for the standardization of the Klett-Summerson is found in the book which accompanies the machine, but some additional information not included therein should be emphasized.

The tubes which accompany the machine, or additional ones purchased, are not accurately calibrated and this must be done before accurate results can be obtained. In order to "pair up" these tubes, place distilled water in several and insert one (No. 1) into the machine. Using either the blue or green filter, adjust the potentiometer reading to "O." Remove the tube and insert a second tube and note the deflection of the needle from the "O" point. If it moves so that a scale reading is obtainable, take the measurements and make it +2, or whatever the scale value denotes. Re-insert the No. 1 tube to establish the equilibrium of the machine and then take the reading of another tube. If this one falls to the "minus" side, or the left side of the scale, mark it as such and place in another rack. Continue this procedure until all tubes have been identified as either plus or minus. Then take one tube from either the plus or minus rack, adjust it to "O" and try to match one of its group with it. When you find one that has the same value, set each of the "paired" tubes to "O" against each other. Those tubes with minus readings are harder to "pair up" but it can be done by setting one to "O" and finding one in its group that will match it. These tubes are then used in pairs—one to bring the machine to equilibrium and the

other to determine the concentration of the solutions tested. Under no circumstances pick tubes at random to read the unknown. It has been found that tubes will vary from  $\pm 1$  to  $\pm 7$ , which, as you can see, will give too erroneous results for accurate determination. This is especially evident in the results obtained in Van den Bergs, Phosphatases, and any other test where a  $\pm 10$  percent makes the difference between a normal and abnormal report. Do not standardize or equalize the machine with the tube of HCL as is used in hemoglobin determination and then use a "calibrated" tube to read the unknowns.

Many people advocate that setting up a standard with each series of unknowns is a waste of time—but it has proved profitable to entail a little more work and turn out reports that are accurate. By running a standard one can determine the rate of deterioration or supersensitivity of reagents and compensate for such by either lengthening or shortening the time of heating, cooling or standing.

Just suppose that you neither "paired up" your tubes nor ran a standard with a test. The tube may have a plus value in relation to the distilled water blank and the alkaline copper solution was supersensitive to the point it read 120 instead of 95-105 as the case may be. You can see from that, the scale reading will have a relative +26 value over your unknowns, and naturally the end result will be high sugar values.

An excellent, but sometimes neglected, practice is to wipe the tube clean each time it is inserted into the machine. The simple technique alleviates error from finger prints, dust and spilled solutions on the tube. Also, be sure the filter itself is scrupulously clean.

The machine should never be placed in such a position that vibrations, air current, light or heat will affect it. A good practice is to have a special well built into the table or desk top to hold it, reinforce the button on the well with a sponge rubber mat 1-inch- $\frac{1}{2}$ -inch thick to help absorb any vibration. Keep the machine covered when not in use to protect it from dust, light and air.

If it is at all possible, only one person should use the machine. This procedure will help give the machine longer life and more accurate readings. Should more than one use it, careful instructions for its manipulation should be given and followed, so that a standard procedure can be employed throughout the laboratory. In other words, do not let just anyone and everyone use it, using their own particular technique. Like cars and fountain pens, once broken in a certain way, another ruins it if he doesn't follow exactly the same method.

Some people believe that the short circuit switch should be off after each determination but practice shows that this will

tion lamp activates each of two "blocking layer" photo-cells mounted at the rear of individual closed compartments. Fluctuations in light source do not affect the readings of the solution because the delicate and expensive meters for current measurements are replaced by a null point method which requires only a single wire-wound potentiometer and low sensitivity galvanometer with no sacrifice to precision of measurement.

Through the slits in the compartments the light strikes the cells and by introducing into the opening in the top of one compartment the test-tube containing the solution under examination, the light is interposed by the "working cell." The current output of this cell becomes a measure of light absorbing properties of the solution. The reference cell or "standard cell" is continuously activated by the source of light and is in no way affected by the procedure of measurement on an unknown solution.

The sole purpose of this cell is to furnish a source of current against which changes in the current output of the working cell can be measured. Should a fluctuation in the potentiometer balance occur, due to change in light intensity, the reference current will vary to the same relative extent as the working cell and thus cause no differential current flow between them.

All measurements are obtained in terms of the color response to one cell only and are made in terms of the scale attached to the potentiometer. The scale records the position of the sliding contact with respect to the full length of the potentiometer resistance; the zero reading corresponding to the condition in which the full value of the potentiometer resistance is in the galvanometer circuit. The scale is graduated in such a manner that the reading of the unknown solution is measured in terms of the logarithm of the ratio between the photo-cell current corresponding to the light transmission of the reference fluid and the current corresponding to the light transmission of the unknown solution. When the needle is at zero on the scale, 100 percent of light is transmitted but when an unknown solution is substituted, the deflection of the needle (or scale reading) is directly proportional to the light transmittance of the unknown solution. This is where Beer's law enters the picture.

The transmittance of a solution containing light-absorbing material depends upon (a) nature of the substance, (b) wavelength of the light, and (c) amount of light-absorbing material in the light path; the latter depending in turn upon the concentration of substance and depth of the solution through which the light passes. The relation between those various factors was first clearly established for colored solutions by Beer, and hence is

shorten the life of the machine. Leave it on the entire time the machine is in operation. Also, do not take a reading of an unknown and fail to bring the potentiometer scale back to "O" point. This oversight sometimes leads to a stuck needle and it is rather difficult to free it. Do not let the needle swing so far to the left or right as to endanger its "sticking" when making a determination.

About once every two weeks clean the potentiometer wire from oxides by turning the knob over a portion of the scale back and forth a few times, being careful not to turn it so far that the needle will either bounce from the sides or stick.

Should you have trouble with the needle "sticking" at the "O" or swinging to the left of the line when a solution or other than water is inserted, it may be the photo-cell is at fault. If the needle remains at "O" when an unknown is inserted instead of swinging to the right, it may be the magnet or the galvanometer. If this occurs the best remedy is to either buy a new machine or return it to the factory. The most common trouble encountered, especially in climates of high humidity, is the formation of oxide deposits on the wire and contact points of the potentiometer. This is evident by the characteristic behavior of the pointer when reading an unknown.

Normally a point is reached on the scale that is the value of the solution, but if the pointer "wanders," reaches this point, then swings to a higher reading so that one wonders which value is correct, then the contact point of the potentiometer has become oxidized and is not touching all points of the potentiometer wire. This is easily remedied by sending the machine to the local distributor who "sands" the deposits off so that the contact can be made.

If one will endeavor to understand the equipment with which he is working and follow a few basic rules governing its mechanism, he will find the resulting confidence in his reports and the equipment will justify the trouble and time expended.

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## EDITORIAL

### A PLACE FOR MEDICAL TECHNOLOGISTS

The Medical Technologist finds himself with an important part to play in the Civil Defense programs being set up over the entire country. With an increased awareness of the importance of using qualified personnel in the procurement and processing of blood, the medical branches of Civil Defense organizations are including the registering of technically trained people. Throughout the nation our organized groups are setting up programs concerned with making a definite place for each technologist in case the necessity should arise for immediate action. **EACH OF US, AS A MEDICAL TECHNOLOGIST HAS A PERSONAL RESPONSIBILITY IN THE OVER ALL PROGRAM.**

Our services have been offered as an organization to the national authorities while many of the state groups have been actively engaged for several months in actually carrying out coordinated programs of preparation. The whole is a program for which each of us should feel his responsibility as a qualified individual. As organized groups, first in line are our local and district societies, with all state organizations offering programs for that larger governmental division, and the final pooling of ideas and plans from which specific needs may be met emanating from the national society. In civil defense each city, county, district, state, or group of states, will have programs set up and ready to be followed in case of disaster. No one specific plan can be set up on a national basis because of the diversity of local conditions. However, as far as medical technologists are concerned, there are basic principles upon which to build specific local programs. **LOCAL SOCIETIES SHOULD OFFER THEIR SERVICES TO THE LOCAL CIVIL DEFENSE AUTHORITIES. STATE SOCIETIES DO THE SAME TO STATE AUTHORITIES.** Each organization works directly with the unit on the same governmental level.

First, our organized societies, being made up of trained personnel, with credentials, must offer the services of their members to the Health and Medical Care Committees of the Civil Defense organizations on the respective governmental levels. With our organized groups as nuclei, we can reach out and call upon other personnel as needed, but the Society is responsible, with those members outside the heavily populated cities being most likely to have to carry the load in case of actual emergency. **THIS LAST POINT FOCUSES THE NEED FOR A CERTAIN AMOUNT OF STATE-AREA-NATIONWIDE COORDINATION.**

From our organization we reach out first to the non-member registered Medical Technologists (ASCP), then to such students as are being trained in schools approved by the AMA Council on Medical Education and Hospitals. Among the registered technologists we contact are those individuals whose certificates carry the blue seals denoting that they have not practiced their profession for five or more years, but just as they are eligible for full active membership in their professional organizations (as they hold a "certificate from the Registry of Medical Technologists of the ASCP") they are permitted—and should be encouraged—to participate in the Refresher courses on Blood Bank technique, just as are those other registered technologists whose activities have led them toward specialization in fields other than serology and hematology. It would be wrong to allow such trained potential (in spite of their present "rustiness") to be lost to our part in the Civil Defense program, when we may need every "head, heart, and hand" so inclined. After we have "in the fold" every available medical technologist, we can turn to other laboratory workers, many of whom we will find to be well-trained in laboratory procedures,

but who do not hold unquestionable credentials. Many of these will already have offered their services, and we shall find them to be cooperative in the program which may be of vital interest to all of us. Other classes of personnel whom we should enlist as a part of the auxiliary forces are such college students as are being trained toward our profession. THERE SHOULD BE A LISTING AVAILABLE IN OFFICIAL HEADQUARTERS OF ALL MEDICAL TECHNICAL PERSONNEL: organized registered Medical Technologists (ASCP), other registered MTs (ASCP), both active and inactive (who must be enrolled in their own professional group), students in "Approved" schools, non-registered laboratory workers, pre-medical technology students at a college level.

From personnel we should turn to equipment and have recorded all sources of such that might be necessary in case of emergency and sudden widespread disaster. These would be in addition to materials in centralized locations as we think of in the more populous areas. This reference is primarily concerned with such materials as might be necessary in addition to the already well planned and coordinated Blood Bank services. In this connection we have to think of the organization of laboratory services in emergency hospital units adjacent to the prime potential disaster areas. Of interest in this respect we can refer to the article on Civil Defense Planning in LIFE Magazine, December 18, 1950.

Among the local and state groups whose activities are already under way are those of Washington, D. C. (described in the August, 1950, Newsletter), the Massachusetts Association, the Colorado State Society, a five-state group composed of the Dakotas, Iowa, Wisconsin, and Minnesota, whose "North Central Committee on Blood Banks" has drawn up the following plan which has been endorsed by the Minnesota Society, at least, and possibly by others (we have not had direct confirmation of the endorsement by the other state societies involved). The Minnesota Society has drawn up a plan by which the Blood Banks in the state, with the cooperation of technologists and pathologists involved, will offer reviews to technologists who will be allowed time for their study.

\*"A similar program is being arranged with other personnel who might be involved at the time of a disaster. It is the hope of the North Central States Committee to train people outside the city as well. If any of the larger cities were ever bombed, the bulk of the work at first would fall to the people around the state.

The following are the 'Amended Recommendations to Blood Banks for Emergencies Agreed upon by the North Central States Committee on Blood Banks at a Meeting Held in Minneapolis, Minnesota, October 17, 1950':

#### Personnel:

It is recommended that:

1. Each blood bank make an estimate of the number of additional medical technologists, nurses, receptionists, clerks, or volunteer assistants who may be needed to operate 12 or 24 hours per day when large amounts of blood may be needed to supply blood for unusual civilian needs, possible civilian disaster, or requests to supply blood for the Armed Forces.
2. A training program be initiated in blood banks as soon as possible for giving refresher training to qualified nurses in drawing blood from donors and to qualified medical technologists in doing laboratory work and other technical duties connected with blood procurement and processing.

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\* Reprinted by permission from the *Minnesota Medical Technologist*, Vol. 14, No. 1. (October, 1950.)

3. The State Medical Societies, State Board of Health, State Nursing Associations, and the State Societies of Medical Technologists be informed of the proposed plans and asked to express their willingness and their ability to cooperate in these plans.

4. Receptionists, clerks and other non-technical personnel be solicited to come to blood banks as volunteers to receive orientation, indoctrination, and specific instruction in case a larger number of personnel would be needed to assist in blood procurement for emergency, and whenever deemed advisable that the Red Cross and/or other organizations should be requested to aid in this project.

5. An emergency file be compiled by each blood bank of trained blood bank personnel who would be available on call in event of any emergency situation.

#### Equipment:

It is recommended that:

1. The participating blood banks of the five states agree upon uniform, standard, interchangeable equipment which may be used for drawing blood and sending it, adequately labeled, with pilot tube and recipient set to the place where it would be used in case of an emergency or community disaster. Such equipment shall conform to the standards of the National Institute of Health.

2. Participating blood banks avail themselves of containers suitable for transporting blood.

3. Equipment for the drawing, storage and administration of blood and the storage of plasma be made available in areas decentralized from the main banks.

4. Insofar as possible, each bank have on hand a two months' normal supply of bottles and a one month's supply of disposable donor sets and other supplies readily available over and above the normal needs for procuring blood for emergency.

#### Donor Procurement:

It is recommended that:

1. A donor procurement program for an emergency situation be drawn up by each blood bank in conjunction with the local chapter of the American Red Cross.

2. An agency central to the five state area be established to which emergency requests for blood can be addressed. It shall be the duty of this central agency to have knowledge of the location and volume of all immediately available blood in the area.

3. The North Central States Committee on Blood Banks automatically be made the agency for functioning and dissemination of information in the event of an emergency.

#### Auxiliary Bleeding Centers:

It is recommended that:

1. In conjunction with the local civil defense committee, hospitals, schools, churches and other large public buildings be designated where auxiliary bleeding centers may be set up.

2. Blood banks in considering the storage of equipment and supplies at a distance, exceed the probable destruction area in storing such supplies.

3. Each blood bank set aside equipment necessary to create a mobile unit and if the bank does not operate its own truck, make arrangements for the facilities of some local truckers to transport the equipment.

4. Central blood banks enter upon a program of integrating small hospital blood banks outside their own immediate area so that these small units can participate in the overall program.

**Transportation:**

It is recommended that:

1. Each blood bank survey the availability of and make arrangements for the use of refrigerated trucks used by meat distributors or other similar conveyances.
2. This committee make proper contacts and arrangements for a master plan of transportation of blood with Civil Defense and organizations such as the Civil Air Patrol, State Patrol and other agencies.
3. Depots and centers for gathering blood and shipping blood be arranged.

**Communication:**

It is recommended that:

1. Problems of communications be coordinated with the state Civil Defense Agency.

**Coordinating the Program:**

It is recommended that:

1. The present committee continue functioning and that it coordinate its efforts with the National Emergency Blood Program with the assurance that the present intent and purpose of this committee will fit itself into the framework of the U. S. Civil Defense Program.
2. This committee investigate the availability of federal aid in this program.
3. The name of this committee be the North Central States Committee on Blood Banks.

**The Committee:**

James Y. Clark, M.D., Pathologist, Sioux Valley Hospital,  
Sioux Falls, S. D.

J. W. Edwards, M.D., Chairman, Blood Bank Committee, Ramsey  
County Medical Society, St. Paul, Minn.

T. J. Greenwalt, M.D., Director, Junior League Blood Center,  
Milwaukee, Wis.

John D. LeMar, M.D., Director, Fargo Hospital and Clinic Blood Bank,  
Fargo, N. D.

G. Albin Matson, Director, Minneapolis War Memorial Blood Bank,  
Minneapolis, Minn.

Roger Runft, Administrator, Madison Red Cross Regional Blood Center,  
Madison, Wis.

Edwin T. Thorsness, M.D., Director, Dubuque, Iowa Blood Bank  
Association."

The Illinois Association also offered a resolution at their semi-annual meeting in October.

In several instances the Executive Office of ASMT has been asked for lists of registered Medical Technologists (ASCP) by the Medical Committees of local or state Civil Defense organizations. In these cases, the requests have been referred to the respective state Membership Chairmen or other individuals in possession of the registrant lists (it is much better that the cooperation be through the state societies than by the national organization).

A number of members of the Harris County (Texas) Society of Medical Technologists were privileged to participate in a Symposium on the Effects of Atomic Explosions offered by the Baylor University College of Medicine. Subjects covered include "Atomic Orientation," "Phenomenon and Effects," "Atomic Bomb Injury," "Radiation Effects," "Radiation

Sickness," "External" and "Internal Hazards," "Civil Defense and Medical Services in Atomic Disaster," "Medical Aspects of Atomic Warfare," "Psychological Problems," etc., as well as a number of films on A-Bomb effects. This thirty-hour course was well worth the time spent as the points of view of the instructors such as Dr. T. Bonner, Professor of Physics, Rice Institute; Dr. Charles L. Spurr, Chief, Medical Research, V. A. Hospital, and Associate Professor of Medicine, Baylor University College of Medicine, Houston; Dr. Elda E. Anderson, Health Physics Division, Oak Ridge National Laboratories, Oak Ridge, Tenn.; Dr. George M. Lyon, Chief Isotope Section, V. A. Central Office, Washington, D. C.; Brigadier General Jas. P. Cooney, Chief AEC Commission's Radiological Branch, Washington, D. C., and others of equal note, had a psychological effect that could well be more widespread in these troubled times. An insight into the possible effects of widespread disaster was given, together with the facts that with proper organization and knowledge of the same, much of the mob hysteria, and its consequent paralyzing effects (with a feeling of futility of action), could be avoided. In short, in such knowledge of the possibilities, and concomitant organization of such facilities as are available, might lie the very survival of a city, and a large part of its population. Thus, while the basis of organization is local, there must be active participation in all branches of outlying facilities. This would, of course, hold true for the part each medical technologist, urban or rural, will play in the over all program, whether it be in the Blood Bank, or in the less publicized and spectacular fields of hematological diagnosis and emergency hospital laboratories, in case of actual A-bombing and its consequent effects.

EACH INDIVIDUAL TECHNOLOGIST and ORGANIZED SOCIETIES, must turn to YOUR RESPONSIBILITY, and ACT NOW, to take your rightful place with Civil Defense. Remember, this is a LONG RANGE PROGRAM, WE HOPE WE SHALL NEVER HAVE TO PUT IT TO ACTUAL USE, but it is a PROGRAM WHICH WILL HAVE TO BE FOLLOWED AND IMPROVED UPON FOR YEARS TO COME. The students of today will become the leaders in this program as it will be continued through many tomorrow. LET US BE PREPARED TO DO OUR JOB, BE PREPARED TO ACT IN CASE OF EMERGENCY, BUT GO FORWARD WITH OPTIMISM, and hope we shall never have to face the disaster for which we are prepared.

R. M.

#### TIRED?—OR BORED?

Not tired or bored are you? But if you feel "that way," try this as a remedy: learn something new about your work. Try doing something "routine" in a new way. Read another technique and try it. Try reversing the order of doing your work—it may be slightly confusing at first, but it does "clear the cobwebs" from that brain of yours if you have to start thinking about "the next step." How would a newcomer be impressed with your lab? Would he notice how orderly it is, or would he find the oil immersion lens still sticky from that last slide? Try looking at the old job as if it were brand new!

R. M.

### THE GAVEL

The October meeting of the Board of Registry was a real occasion for Miss Reilly, Miss White, and me; we were the first ASMT members to sit on that Board as full members of it, and we are deeply grateful to you people for allowing us that privilege. We hope that we represented you adequately. The six pathologists who compose the rest of the membership of the Board are most interested in our profession, and the spirit of active cooperation was perhaps the most notable aspect of the meeting.

Several matters were discussed which vitally affect ASMT as the representative group for all ASCP registered technologists. Probably the one in which many of you are most interested concerned making examination questions. As you know, these questions are made by the members of the Board with what expert help they can individually find; and as you can well imagine, the task becomes harder each six months. It seemed to the members of the Board that one source of expert consultation had not been tapped: the practicing medical technologists themselves. So our Society was asked to submit multiple choice questions in all fields of medical technology for use on future examinations. Here is your chance to see that the type of question asked meets with your approval. Anne Sommer, 1325 South Grand, St. Louis, Missouri, has agreed to act as collector for your questions, so please flood her with them. All questions to be eligible for the next examination should be in Anne's possession by February 15, so you must act fast.

The Board again set up a fund of \$2000 to be used in Vocational Guidance and Recruitment of medical technologists. Ruth Feucht is our representative on the committee which spends this money, along with a representative of the Board of Registry and a representative of the Board of Approved Schools. I am sure that you will all continue to cooperate with Ruth and her ASMT committee working with this larger group. Another fund which we have had given us in the past and which was repeated this year is that for availability for loans to state groups for conducting seminars where financial aid is needed. This fund is being used more each year, and it is the hope of the Board that its use will be continued with educational benefit to all medical technologists. As you know, Estelle Downer is the chairman of the committee which dispenses that fund.

A new allotment was made this year. We have loan sets made by our Education Committee. It was felt that they could be supplemented by a somewhat different type of loan sets. A sum was set up to pay for having sets made in duplicates of fifty each, so that seminars might be built around these sets. For instance, one suggestion has been made that fifty duplicate slide sets be made on parasitology with a commentary prepared to accompany and explain them. Thus fifty technologists might hear the commentary and at the same time have his own slide under a microscope to study. Another suggestion was for buying good kodachromes in hematology and having a commentary to be read as they were shown. Our Committee on Education will have the job of deciding and spending the fund, and I am sure that they would welcome your suggestions, so if you have ideas as to subject matter or how to obtain specimens, please write to Rose Hackman, our Education Committee chairman.

So much for money.

The members of the Board of Registry had the privilege of meeting with Dr. Israel Davidsohn, author of the CURRICULUM for Schools of Medical Technology, while we were in Chicago. We are all indebted to Dr. Davidsohn for the time and effort he has put into writing and revising the CURRICULUM, and now it seems that we are to go further

in his debt. He, with the assistance of two of his colleagues in Chicago, is undertaking a radical revision, and the result will be a much improved, contemporary guide to teaching. He has many ideas for improvement and is enthusiastic in his discussion of the proposed changes; at the same time he is eager to know the opinions of others as to what would constitute needed changes to make the text more usable. He made an especial appeal that medical technologists communicate with him if they had any suggestions; he is very sincere in his request and would appreciate hearing from you. Incidentally, commendations as well as constructive criticisms are certainly in order.

Representatives of your Civil Service Committee were in Chicago and working hard on their assignment, getting good helpful consultation from the wealth of experts there for the ASCP meeting. Those members of your Board of Directors who were there managed to get in a few licks, too, so we feel that October was a month of accomplishment for ASMT. We'd appreciate knowing how you feel.

V. J. S.

#### NOTICE

In June, 1949, it was deemed necessary to increase the facilities of our Executive Office. At that time the Board of Directors ordered a full-time Office set-up and obtained the services of a full-time Secretary-Editor, the AJMT to be edited from the same office. Since this was a new venture, the Board felt it wise to specify that such arrangement be for a period of two years. Next June, that period will be over. The present Board has investigated the set-up of comparable offices in other organizations and has agreed to recommend that our present arrangement be continued. If that recommendation is approved by the new Board, it will be necessary to simultaneously appoint an Executive Secretary-Editor. All applications for this position should be sent to the Chairman of the Board of Directors for 1951-52, Miss Lavina White, MT (ASCP), Pueblo Clinic, Pueblo, Colorado, and should be in her hands not later than May 1, 1951.

## ANNOUNCEMENTS

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### COMMISSIONING OF LABORATORY OFFICERS IN THE ARMY MEDICAL SERVICE CORPS RESERVE

Attention is invited to the fact that women as well as men are eligible for appointment in the Army Medical Service Officer's Reserve Corps as hospital laboratory officers. The needs for these officers on extended active duty are increasing with the opening of new hospitals. Qualifications for appointment are outlined in Special Regulations No. 140-105-6, 12 October 1950. Waivers of age in grade limitations may be granted in cases of individuals whose services are desired for immediate active duty to include maximum age in grade limitations of 38 years for second lieutenant, 41 years for first lieutenant. Officers in the reserve are eligible for promotion to full colonel and the pay schedule ranges from \$3789.00 for second lieutenant, \$4306.00 for first lieutenant, to \$8604.00 per year for colonels. The basic pay is subject to periodic increases based upon cumulative years of service and for officers with dependents, rental allowances amount to approximately \$100.00 to \$200.00 additional per year, depending upon the grade.

Medical laboratory specialists are appointed in the Medical Allied Sciences Section of the Medical Service Corps Reserve. For appointment in grade of second lieutenant, applicants must have either a Master's degree from a school or university acceptable to the Army in a specialty allied to medicine, or a bachelor's degree, experience, and certification as a clinical laboratory technologist. Certification, acceptable to the department of the Army, is by the Board of Registry of Medical Technologists of the American Society of Clinical Pathologists. The laboratory specialists particularly needed are biochemists, bacteriologists, and clinical laboratory officers. Applicants for positions as clinical laboratory officers may be considered qualified if they have a bachelor's degree with specialization in fields allied to medicine and certification as medical technologists.

Qualifications for a first lieutenant are a Ph.D. in a specialty, or in addition to the requirements for second lieutenant have had additional qualifying education and/or appropriate progressive experience. For detailed information and application blanks consult the nearest Army installation, recruiting station, or write to Chief, Personnel Division, Office of the Surgeon General, Department of the Army, Washington 25, D. C.

### REGISTRY CARD RETURNS

It might be of interest to you to know what is being done with the cards which you received with your Registry renewal blanks. These were, of course, primarily to get statistics for the Civil Service—Armed Service Committee, in order to see approximately what percentage of registered Medical Technologists are Civil Service employed and at what rating, together with seniority in point of time. They are serving still other purposes as well. Application blanks and Information Pamphlets have been mailed to over 900 non-members of ASMT (some of these people had listed themselves as "members" but they are evidently still under the impression that they are "members" of the Registry, and still do not know that the Registry of Medical Technologists and the American Society of Medical Technologists are not the same). It will be interesting to see how many of these people to whom we send the application blanks will become ASMT members in the near future. This poll should prove to them that "we" are doing something. We are saving these cards and will be glad to send them to the state treasurers or membership chairmen who are interested in checking the results.

We are also receiving a good percentage of cards from our ASMT members who are not C. S. employed. The member response is being checked by states just as are the other classifications.

HAVE YOU RETURNED YOUR CARD?



The Program Committee for the 1951 Convention announces the following tentative plans for the Annual Meeting to be held at the New Ocean House, Swampscott, Massachusetts:

**Sunday, June 24:**

- 8:00 A. M. Registration
- 1:00 P. M. Advisory Council
- 1:30-4:00 P. M. Historical Tour
- 7:30-9:30 P. M. Reception

**Monday, June 25:**

- 9:00-9:30 A. M. Invocation, Welcome, Greetings
- 9:30 A. M. House of Delegates Meeting
- 12:00 Noon Exhibits Open
- Evening. Square Dancing or Cards, Optional

**Tuesday, June 26:**

- 9:00-12:00 Noon. Scientific Program
- 12:00-2:00 P. M. Noon Recess and Exhibits
- 2:00-5:00 P. M. Scientific Program
- 6:30 P. M. Dinner and Entertainment

**Wednesday, June 27:**

- 9:00-12:00 Noon. Scientific Program and Workshops
- 12:00-1:00 P. M. Noon Recess
- 1:00-4:30 P. M. Trip to Gloucester and Return
- 4:30-6:30 P. M. Exhibits and Shore Dinner at the Hotel

**Thursday, June 28:**

- 9:00-12:00 Noon. Scientific Program and Workshops
- 12:00-1:30 P. M. Noon Recess and Exhibits
- 1:30-4:00 P. M. Scientific Program
- 4:00 P. M. Exhibits
- 7:30 P. M. Banquet and Entertainment

**NEW AWARD ADDED THIS YEAR**

PARASITOLOGY AWARD of \$25.00—for the best paper submitted on Parasitology. Deadline for this award will be April 1, 1951.

**FORMER AWARDS BEING GIVEN**

- 1. ASCP Registry Award. Deadline March 15, 1951.
- 2. ASMT Award. Deadline April 15, 1951.
- 3. Hillkowitz Memorial Award. Deadline March 15, 1951.

We enjoyed Mary Eichman's presentation of the 1949 Convention material so well that we should like to borrow very liberally and quote: "Now is your opportunity to have a definite share in the progress of Medical Technology. Help us to continue in the effort to make others cognizant of the fact that the medical technologists themselves are contributors to this advancement. Your participation by reporting on special research projects, comparative evaluation studies, your experience with new techniques, or your way of solving problems encountered in any of the routine procedures, will exemplify the active part assumed by ASMT members." The following notes will remind you of the few important rules applying to the program:

- 1. The DEADLINE DATE for papers to be received by the Program Committee from individuals desiring to present papers at the 1951 National Convention is noted above.
- 2. Only ASMT members are eligible to compete for Convention Awards. All competitive papers must be presented in person or by proxy at convention time.
- 3. All papers read (by members) before the annual Convention or submitted to the Society become the property of ASMT and may be published in the AMERICAN JOURNAL OF MEDICAL TECHNOLOGY.
- 4. The time limit for reading the paper on the program is 15 to 20 minutes exclusive of showing slides—the remainder of approximately 30 minutes is to be given to discussion.
- 5. All audio-visual aids and professional technicians to operate them will be supplied by the Speakers Supplies Committee, 3½ x 4 standard lantern unless otherwise specified.
- 6. FIVE (5) copies of your manuscript must be submitted to the Program Committee Chairman. These must be typewritten, double spaced on regular size typewriter paper.
- 7. TWO (2) copies of the manuscript must be submitted by all those NOT COMPETING for ASMT Awards and subject to the instructions above.
- 8. PRIZE PAPERS from State Contests to be considered for presentation and further awards, must be in the hands of the Program Committee Chairman by March 15, 1951.

**PROGRAM COMMITTEE**

Chairman: Helen Madden, 86 Jersey St., Boston, Massachusetts  
Ruth Cleo Ball, 3000 Polk Avenue, Ogden, Utah.  
Marie Colburn, 2046 Mt. Washington, Colorado Springs, Colorado.  
Lydia Brownhill, Meriden Hospital, Meriden, Connecticut.  
Sister Mary James, Santa Rosa Hospital, San Antonio, Texas.  
Sister Mary Alcuin, O.S.B., College of St. Scholastica, Duluth, Minnesota.  
Ellen Skirmont, 5493 South Cornell Street, Chicago, Illinois.

### PUBLICITY SPEAKS

Oh Medical Technologists, come listen to me,  
All of you, members of ASMT  
From California to Florida, Texas to Maine,  
You are the ones we want to entain.  
Be ready for fun and education galore  
When festivities start on June twenty-four.

With Registration on Sunday, the program starts,  
Welcome to New England, from all parts.  
At New Ocean House in Swampscott, Mass.  
A Reception at night which none can by-pass  
To greet old friends and make new ones too.  
You know that we will be looking for you.

On Monday, Vernal will stand at the helm,  
ASMT business constitutes our realm.  
See the exhibits. Have a dip in the sea.  
Be ready to Square Dance, you and me.  
On Tuesday, the Scientific Meetings begin  
And a lot of knowledge we're out to win.

The Workshops will start on Wednesday A.M.  
Our mutual problems will come to an end.  
For fun, a trip by sea and land  
To view our famous old Cape Ann.  
A Shore Dinner awaits when we get back  
Of lobsters and clams, there is no lack.

All things come to an end, 'tis true.  
Thursday's the turning point for me and you.  
Workshops and meetings, the order of the day.  
What a time for ourselves to learn and play.  
A Banquet at night, awards for the winners  
For papers you write, oldsters and beginners.

Save your pennies. Remember the date.  
1951 Convention, June 24-28.  
Plan to vacation in a New England town  
Filled with history of great renown.  
Massachusetts awaits you, ASMT  
At our Convention by the shores of the sea.

### EXHIBITS

Miss Mary Molloy, Scientific Exhibit Committee Chairman is anxious to hear from all technologists for the 1951 Convention at the New Ocean House, Swampscott, Massachusetts, June 24-28. Are you doing some special work that you can demonstrate to the rest of us? All State Presidents are being asked for some exhibit from their state. If you have some special or new techniques, why not share them with us? Contact Miss Mary Molloy, Boston Health Department, Haymarket Square, Boston, Massachusetts.

Exhibits shown at state conventions should be shared with all ASMT members at the national meeting. Won't you enter yours?

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BE SURE TO READ YOUR HOSPITAL'S COPY OF HOSPITAL TOPICS!

**NOTICE TO SISTERS**

The 1951 ASMT Convention is progressing beautifully in its plans under the management of Mrs. Elinor Judd. Mrs. Judd has contacted the New Ocean House, Swampscott, Mass., and the management has been most cooperative and is very eager to accommodate the Sisters in the matter of privacy in housing us.

However, we know that there are some Communities whose regulations prohibit the Sisters from living in hotels. We shall be extremely grateful if those Sisters would please notify me at once, even if you are not certain at this early date, so that we can begin now to arrange accommodations in the nearby Convents. This is particularly important because we have to arrange not only housing but transportation facilities back and forth from the Convents to the hotel.

The New Ocean House could not quote 1951 prices, but the following is a sample of the 1950 prices.

Double Room with Bath, Twin Beds, \$10, \$10.50, \$11.00.

Large Room with Bath, Three Beds, \$9.50.

Large Room with Bath, Four Beds, \$8.75 and \$9.00.

Single Room with Bath, \$13.00.

**ALL QUOTATIONS ARE FOR ROOM AND MEALS—THESE ARE CONVENTION RATES.**

It is our earnest wish that every Sister will make a real sincere effort to be present at this Convention. The Eastern States, particularly the New England States and Middle Atlantic States are in need of publicizing the Registry and the ASMT. This is a wonderful opportunity. There are still many Sister-technologists who are neither registered nor of course ASMT members. We wish to convince them of the necessity of joining us, and this will help greatly to do so.

If there is anything that I can do, to assist you make your plans, to obtain your permission, to arrange your travel, etc. etc., please do not hesitate to call on me. I wish to place myself at your service, and to make this 1951 Convention the best attended and most fruitful convention the Sisters have ever attended.

Sr. M. Clare, O.S.F.  
Chairman, Sisters' Hospitality Comm.  
St. Clare's Hospital  
415 West 51st St., New York 19, N. Y.

**AWARDS**

For the benefit of the new members of our organization, we would like to give a brief history of our awards. In the fall of 1948, the Education Committee of the ASMT thought that a monetary reward might stimulate the members of the Society to do and report on some original work in the field of medical technology. Two laboratory houses were contacted—the Will Corporation and The Denver Chemical Company, Incorporated. Each consented to give \$100.00, making a total award of \$200.00. In 1949, the award was first given under the name of the Hillkowitz Memorial Award, in honor of Philip Hillkowitz, M.D., who had done so much for the Society. This award was given again in 1950 and will be given in 1951 to the member reporting on the most worthwhile original contribution to the field of medical technology.

The ASCP Award of \$50.00 was established at the 1941 meeting of the Board of Registry for the best paper presented by a medical technologist at the annual meeting of the American Society of Medical Technologists. To be eligible for this award, the paper doesn't have to be an original work.

## SCHEDULE OF LABORATORY TRAINING COURSES

Jan. 1 to Dec. 31, 1951

DATES	COURSES	Duration	Program and Location Number*
Feb. 12-23	Laboratory Diagnosis of Syphilis.....	2 Weeks	8. 72-8
Feb. 26 to Mar. 2	Microbiology for Public Health Nurses.....	1 Week	9. 60-8
Feb. 26 to Mar. 9	Laboratory Diagnosis of Bacterial Diseases General Bacteriology, Part 1.....	2 Weeks	8. 40-8
Mar. 5-23	Laboratory Diagnosis of Parasitic Diseases Part 1, Intestinal Parasites.....	3 Weeks	8. 00-8
Mar. 12-23	Laboratory Diagnosis of Bacterial Diseases General Bacteriology Part 2.....	2 Weeks	8. 41-8
Mar. 12-23	Laboratory Diagnosis of Syphilis.....	2 Weeks	8. 72-8
Mar. 26 to April 13	Laboratory Diagnosis of Parasitic Diseases Part 2, Blood Parasites.....	3 Weeks	8. 01-8
Mar. 26-30	Laboratory Diagnosis of Enteric Diseases Part 1, Introductory Enteric Bacteriology.....	1 Week	8. 50-8
April 2-13	Laboratory Diagnosis of Enteric Diseases Part 2, Advanced Enteric Bacteriology.....	2 Weeks	8. 51-8
April 16-27	Laboratory Diagnosis of Mycotic Diseases Part 1 Cutaneous and Subcutaneous Fungi.....	2 Weeks	8. 15-8
April 16-27	Laboratory Diagnosis of Tuberculosis.....	2 Weeks	8. 55-8
April 16-27	Laboratory Diagnosis of Syphilis.....	2 Weeks	8. 72-8
April 16 to May 11	Laboratory Diagnosis of Virus Diseases.....	4 Weeks	8. 20-9
April 30 to May 11	Laboratory Diagnosis of Mycotic Diseases Part 2, Systemic Fungi	2 Weeks	8. 16-8
April 30 to May 11	Laboratory Diagnosis of Tuberculosis.....	2 Weeks	8. 55-8
May 7-11	Laboratory Diagnosis of Venereal Diseases†.....	1 Week	9. 38-8
May 14-18	Laboratory Diagnosis of Mycotic Diseases†.....	1 Week	9. 35-8
May 14-18	Laboratory Diagnosis of Tuberculosis†.....	1 Week	9. 36-8
May 14-18	<i>Treponema pallidum</i> Immobilization†.....	1 Week	9. 39-8
May 14-18	Laboratory Diagnosis of Rabies.....	1 Week	8. 26-9
May 14-18	Clinical Chemistry Part 1, Introductory and General Procedures.	1 Week	9. 10-1
May 21-25	Laboratory Diagnosis of Parasitic Diseases†.....	1 Week	9. 33-8
May 21-25	Laboratory Diagnosis of Bacterial Diseases†.....	1 Week	9. 34-8
May 21-25	Laboratory Diagnosis of Virus Diseases†.....	1 Week	9. 37-9
May 21 to June 1	Clinical Chemistry Part 2, Quantitative Analyses.....	2 Weeks	9. 11-1
June 4-15	Laboratory Diagnosis of Syphilis.....	2 Weeks	8. 72-8

\* Refer to System of Code Numbers of Laboratory Training Programs and Locations of Training Laboratories.

† These Courses are Designed for Directors.

DATES	COURSES	Duration	Program and Location Number*
Aug. 27-31	Microbiology for Public Health Nurses.....	1 Week	9. 60-8
Aug. 27 to Sept. 7	Laboratory Diagnosis of Bacterial Diseases General Bacteriology, Part 1.....	2 Weeks	8. 40-8
Sept. 3-21	Laboratory Diagnosis of Parasitic Diseases Part 1. Intestinal Parasites.....	3 Weeks	8. 00-8
Sept. 3-28	Laboratory Diagnosis of Virus Diseases.....	4 Weeks	8. 20-9
Sept. 10-21	Laboratory Diagnosis of Bacterial Diseases General Bacteriology, Part 2.....	2 Weeks	8. 41-8
Sept. 10-21	Laboratory Diagnosis of Syphilis.....	2 Weeks	8. 72-8
Sept. 24 to Oct. 12	Laboratory Diagnosis of Parasitic Diseases Part 2. Blood Parasites.....	3 Weeks	8. 01-8
Sept. 24-28	Laboratory Diagnosis of Enteric Diseases Part 1. Introductory Enteric Bacteriology.....	1 Week	8. 50-9
Oct. 1-12	Laboratory Diagnosis of Enteric Diseases Part 2. Advanced Enteric Bacteriology.....	2 Weeks	8. 51-8
Oct. 1-5	Laboratory Diagnosis of Rabies.....	1 Week	8. 26-9
Oct. 8-12	Laboratory Diagnosis of Virus Diseases†.....	1 Week	9. 37-9
Oct. 22-26	Laboratory Diagnosis of Parasitic Diseases†.....	1 Week	9. 33-8
Oct. 22-26	Laboratory Diagnosis of Bacterial Diseases†.....	1 Week	9. 34-8
Oct. 22 to Nov. 2	Laboratory Diagnosis of Syphilis.....	2 Weeks	8. 72-8
Oct. 29 to Nov. 2	Laboratory Diagnosis of Mycotic Diseases†.....	1 Week	9. 35-8
Oct. 29 to Nov. 2	Laboratory Diagnosis of Tuberculosis†.....	1 Week	9. 36-8
Oct. 29 to Nov. 2	Clinical Chemistry Part 1. Introductory and General Procedures.....	1 Week	9. 10-1
Nov. 5-16	Laboratory Diagnosis of Mycotic Diseases Part 1. Cutaneous and Subcutaneous Fungi.....	2 Weeks	8. 15-8
Nov. 5-16	Laboratory Diagnosis of Tuberculosis.....	2 Weeks	8. 55-8
Nov. 5-23	Preparation and Standardization of Serologic Reagents Used in the Laboratory Diagnosis of Syphilis.....	3 Weeks	8. 73-8
Nov. 5-16	Clinical Chemistry Part 2. Quantitative Analyses.....	2 Weeks	9. 11-1
Nov. 19-30	Laboratory Diagnosis of Mycotic Diseases Part 2. Systemic Fungi	2 Weeks	8. 16-8
Nov. 19-30	Laboratory Diagnosis of Tuberculosis.....	2 Weeks	8. 55-8
By Special Arrangement	Laboratory Diagnosis of Malaria.....	2 Weeks	8. 05-8
	Identification of Medically Important Arthropods.....	2 Weeks	8. 10-8
	Typing of <i>Corynebacterium Diphtheriae</i> .....	1 Week	8. 42-8
	Phage Typing of <i>Salmonella Typhosa</i> .....	1 Week	8. 52-8
	Serologic Diagnosis of Rickettsial Diseases.....	1 Week	8. 75-8
	Virus Isolation and Identification Techniques.....	2-4 Weeks	8. 21-9
	Laboratory Diagnosis of Influenza.....	1 Week	8. 25-9
	Advanced Quantitative Analyses in Clinical Chemistry	1 Week	9. 12-1
	Toxicology.....	1 Week	9. 13-1

Information and application forms should be requested from the Officer in Charge, Laboratory Training Services, Communicable Disease Center, U. S. Public Health Service, P. O. Box 185, Chamblee, Georgia.

### STATE COUNSELLORS FOR ASCP

Are listed on the last page of the *American Journal of Clinical Pathology*. They function in their respective states as spokesmen for the ASCP in the intervals between conventions. We are calling this fact to your attention as occasions might arise when it would be advisable for representatives from our state societies might be interested in contacting a pathologist who could represent his organization officially.

Have YOU PURCHASED YOUR CONVENTION SEALS YET? Send a dime for ten "samples" to: Miss Dorothy Prest, 38 School Street, Manchester, Mass. Prices: 1 cent each up to 400; \$4.00 for 500; \$7.50 for 1000. Buy more and get more for your dollar!

### ADVANCED COURSE IN HEMATOLOGY

A course in hematology will be given at the Thorndike Memorial Laboratory, Boston City Hospital, Boston, Massachusetts, from May 28 to June 8, 1951. This same course will be repeated during the two weeks beginning June 11, 1951. These courses are designated to offer advanced work in hematology to technicians, physicians and pathologists who are familiar with the usual clinical laboratory methods.

It is hoped that technicians who are coming to the Annual Meeting of the American Society of Medical Technologists at Swampscott, Mass., in June will avail themselves of this opportunity to take the course in hematology.

For further information about the course write to Miss Geneva A. Daland, Thorndike Memorial Laboratory, Boston City Hospital, Boston 18, Mass.

### PUBLIC RELATIONS COMMITTEE

ASMT NEEDS GOOD PUBLIC RELATIONS. We have 46 affiliated societies. ONLY 18 have so far been represented in the lab section of HOSPITAL TOPICS. Is YOUR state one of these? Have you SEEN the lab section yet?

There are a VARIETY of items you can send us:

1. "Lab Hints" about an easier or better way of doing something in the lab, or "Time Savers"—some little time saving method or trick.
2. Write-ups of INDIVIDUAL technologists who have done something special or received some honor, whether or not it is connected with the profession—with a PHOTOGRAPH (GLOSSY PRINT) of the individual.
3. PICTURES (GLOSSY PRINTS) of new LAB CONSTRUCTION or new groups being formed, or new apparatus.
4. New techniques.
5. Activities of your societies—state, district, and local.

Send material to:

Miss Josephine Pyle, MT (ASCP),  
Middlesex Hospital,  
Middletown, Conn.

IF YOUR FRIEND COMPLAINS that he did not receive his copy of the January AMERICAN JOURNAL OF MEDICAL TECHNOLOGY, ask if he sent in his address change to the Executive Office, 6544 Fannin St., Houston 5, Texas—or if he paid his 1950-51 dues. Any dues for 1950-51 dues must now be accompanied by the \$1.00 reinstatement fee.

### ANNOUNCEMENT

General Motors has announced a \$1,500,000 research project to promote better health for men and women in industry. It has thus joined with the University of Michigan in establishing The Institute of Industrial Health at Ann Arbor. The long range research project will be administered by a board to be appointed by the University of Michigan. Findings of the Institute, including prevention, diagnosis and treatment of occupational diseases, will be made available to all companies and all employees of American industry. Of the \$1,500,000 granted for the project, a total of \$500,000 will be used as needed for equipment, with an additional \$100,000 annually for ten years for research and to meet the expenses of fellowships, scholarships, added faculty and other personnel, a clinic and publications, and refresher courses for doctors, nurses, and personnel in auxiliary services.\*

\* Would Medical Technologists be included as "personnel in auxiliary services?"

### KIMBLE GLASS DIVISION, OWENS-ILLINOIS GLASS COMPANY OFFERS AWARD

Annual recognition in the form of a \$500 award and a plaque will be available for the first time next year for outstanding work in methodology research, it was recently announced by Dr. A. V. Hardy, Jacksonville, Fla., Chairman of the Conference of State and Provincial Public Health Laboratory Directors and E. J. Rhein, Sales Manager of the Kimble Glass Scientific Division.

The prize, to be known as the Kimble Glass Methodology Research Award, is to be given by the Conference of State and Provincial Public Health Laboratory Directors and is endowed by Kimble Glass, Division of Owens-Illinois Glass Company. Its purpose is to give public recognition and financial reward to an individual who has contributed outstandingly in developing a new or better method of procedure in the field of public health work.

Methodology research has to do with the devising of methods of applying scientific knowledge in the solution of medical and public health problems.

This marks the first time that an award for work in this field has been established and it is the first annual award to be given by the Conference.

Selection of the outstanding work and awarding of the prize will be under the direction of an Award's Committee, Dr. Hardy said. The committee includes: Dr. Samuel R. Damon, Director of Laboratories, Indiana State Department of Health, Indianapolis (Chairman-elect of the Conference); Dr. Malcolm Merrill, Director of Laboratories, California State Department of Health, Berkeley (Past Chairman of the Conference); Dr. Francis C. Lawler, Director of Laboratories, Vermont State Department of Health, Burlington; Dr. Martin Frobisher, Jr., Chief of Bacteriology, Communicable Disease Center, U. S. Public Health Service, Atlanta, Ga.; Dr. Goeffrey Edsall, Professor of Microbiology, Boston University School of Medicine, Boston; and Dr. Albert V. Hardy, Director of Laboratories, Florida State Board of Health, Jacksonville.

### OLD JOURNALS

A limited number of some of the later issues of the journals are still available at the "mailing cost" offer as announced in the November, 1950, issue of the JOURNAL. Have you checked your journal file to see if you might not be able to fill in your incomplete volumes at this nominal cost? If the issues you need are not available in quantity, we shall let you know. Scarce issues are available at the usual "old copy" cost of \$1.50 each, with back annual volumes in limited numbers at \$8.00 each.

## STATE SOCIETIES

### **COLORADO SAYS:**

We are making a concerted drive to have every registered MT (ASCP) wear the registry emblem on his lab coat or uniform, and every student wear the red emblem. This is a "MUST" for identification of those in medical technology. The society is taking the responsibility for distributing the emblems, which may be purchased at a cost of 15 cents each or six for 75 cents from the Registry of Medical Technologists of the ASCP, Muncie, Indiana. (Note: The Executive Office of ASMT does NOT stock these emblems.)

### **INDIANA TECHNOLOGISTS**

For the future of your profession, please lend a helping hand for recruitment. Our recruitment plans are to supply all high schools with pamphlets from the Registry, the nearby approved training hospital and its college affiliate. For those students who become interested in technology, it would be advisable for them to have personal contact with a MT for questions and a possible opportunity of viewing a laboratory. Those of you who would be willing to be counsellors and/or "hostesses" please contact:

(Mrs.) C. Mazzini Hudgens, Phones: LI-3827, WI-1685, 823 Chamber of Commerce, Indianapolis 4, Indiana.

Also, (requested by John Arbogast, M.D., I.U. Medical Center, in connection with Civilian Defense Program) in the event of a national emergency due to atomic warfare, we medical technologists will be called upon to perform blood counts and blood typings. (Inactive members may have a refresher course if they feel it necessary.) Please volunteer by phone or card to the above.

### **THE GEORGIA SOCIETY**

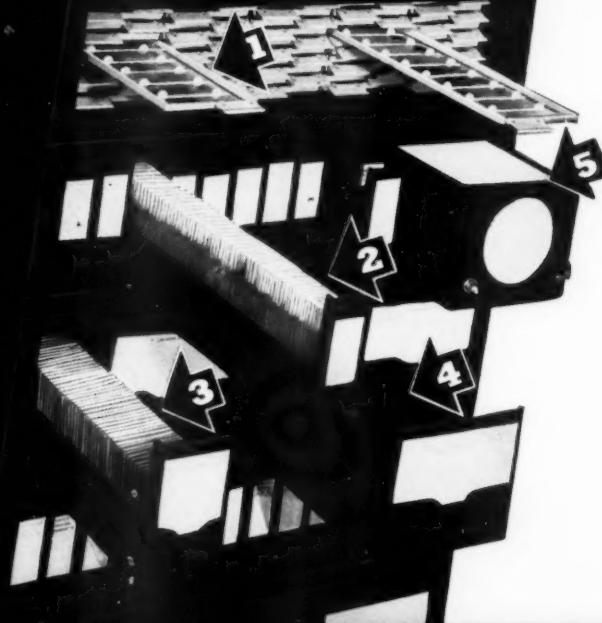
Is working on their own "Fact Sheet" to let the physicians of that state know more about qualified medical laboratory workers.

### **ANOTHER MINNESOTA FIRST**

Is the Service Fund instigated and inspired by Sister M. Alcuin and her fellow technologists of Duluth in 1945, and through the years augmented by the cooperation of the entire MSMT. Award money from the 1945 Convention Exhibit added to the healthy-sized nucleus from competitive efforts of the district societies. Funds helped defray expenses of convention delegates, paper-writing contest awards, loans to deserving would-be technologists (the FUND is kept with the treasury of the society and is subject to voucher service as for all expenditures, but is NOT used to defray the Society's current expenses). The credit page shows a total of \$1167.56 since its inception, with expenditures having amounted to \$412.50. (All loans have been repaid.)

### **THE MISSISSIPPI SOCIETY**

Sent a letter to all hospitals, clinics, and physicians' offices employing laboratory personnel. This included a questionnaire similar to the one sent by the Standards and Studies Committee last year. But they added a note to urge the attendance of the technologist at the state convention in the spring.



**ALL THIS** (or other combinations)  
in 19' square floor or desk space

1. Compartment-trays for drying and flat-filing microslides.
2. One-inch drawers for filing microslides vertically, either spaced or close-packed.
3. Two-inch drawers for Kodachromes and similar transparencies.
4. Four-inch drawer for lantern slides, index cards, or similar.
5. Four-inch drawer fitted with the TECHNILUME, a built-in spot illuminator for slide identification.

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**the compact, flexible, all-steel  
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All vertical-filing drawers are interchangeable to make any combination your particular needs require. Bulletin No. 1600 describes this unique filing system. Please ask for it.

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## Fisher ELECTROPHOTOMETER

**- eliminates the human factor -**

The Fisher Electrophotometer provides accurate, fast and simple analysis for the technician in the busy clinical laboratories of today. Accurate for research, fast for routine or emergency, simple to operate even for the most inexperienced technician, this instrument can be used wherever the color of a solution varies in a definite manner with the concentration of the constituent. It is the standard instrument for clinical colorimetric analysis.

The Fisher Electrophotometer is considerably more sensitive to color, and is more reliable than any technician's eye. Once a calibration curve is made for the standard solutions of any determination, subsequent analyses are conducted as rapidly as the simple operations can be made by the technician. Complete operating instructions and thirteen sample, step-by-step, clinical methods are included in a new 48-page manual furnished free with each instrument.

**Fisher Electrophotometer**, complete with galvanometer, three filters, three 23-ml. absorption cells, manual of typical procedures for use with 110 volts, 50-60 cycle A.C. only ..... \$210.00

Headquarters for Laboratory Supplies

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717 Forbes St., Pittsburgh (19), Pa.  
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In Canada: Fisher Scientific Co., Ltd., 904 St. James Street, Montreal, Quebec



**EIMER AND AMEND**

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New York (14), New York

